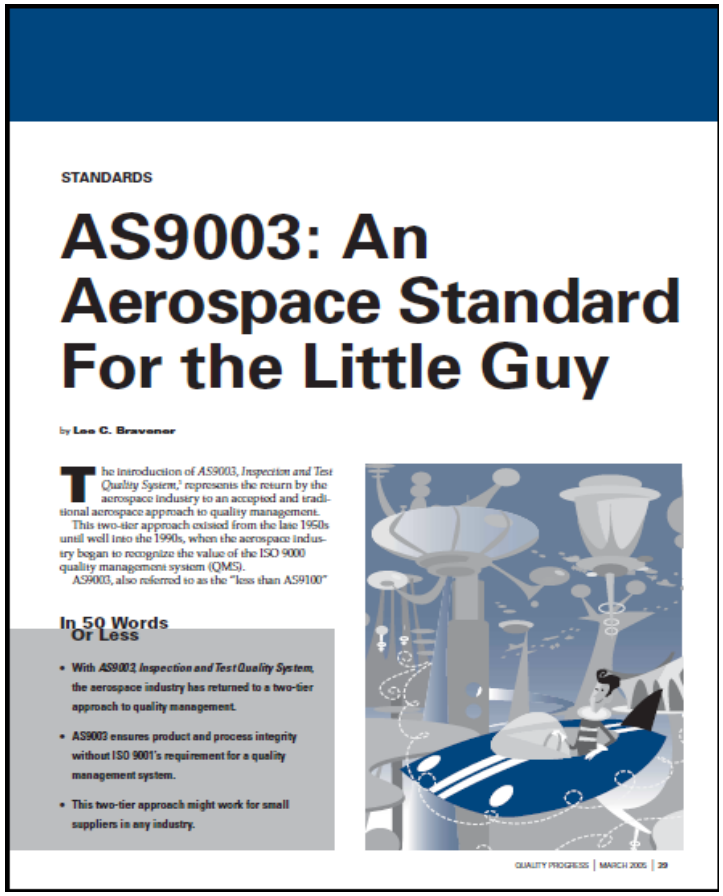
SAE AS9003
Inspection and Test Quality Systems

Goddard Space Flight Center

Supply Chain 2012

Brian Hughitt

Office of Safety and Mission Assurance



STANDARDS

AS9003: An Aerospace Standard For the Little Guy

by Lee C. Bravener

The introduction of *AS9003, Inspection and Test Quality System*,[1] represents the return by the aerospace industry to an accepted and traditional aerospace approach to quality management.

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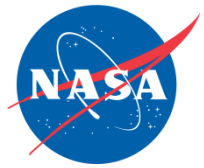
AS9003, also referred to as the "less than AS9100"

In 50 Words Or Less

- With *AS9003, Inspection and Test Quality System*, the aerospace industry has returned to a two-tier approach to quality management.
- AS9003 ensures product and process integrity without ISO 9001's requirement for a quality management system.
- This two-tier approach might work for small suppliers in any industry.

SAE AS9003 Press Release



SAE Aerospace
An SAE International Group

SAE International Publishes Standard for Inspection, Test Quality Systems for Aviation, Space and Defense Organizations

WARRENDALE, Pa., Aug. 23, 2012 /PRNewswire-USNewswire/ -- SAE International's Americas Aerospace Quality Standards Committee has completed Standard AS9003, *Inspection and Test Quality Systems, Requirements for Aviation, Space, And Defense Organization,* and it is now available for purchase.

This quality standard is designed for suppliers that produce noncomplex products for aviation, space and defense customers. This release replaces the 1994 version of AS9003 and is modeled after the current process-based version of AS9100 as well as the Mil-Q-9858/Mil-I45208 quality system architecture that existed for decades within the Department of Defense.

Standard AS9003 provides contractors a less costly alternative to AS9100 for smaller suppliers that manufacture simple build-to-print product. It provides a set of requirements that apply to the inspection and test of noncomplex product and provides assurance that product configuration requirements and customer expectations will be met. Non-complex products are defined as products whose conformity can be fully verified by the customer upon receipt.

"There is a strong industry need for this standard," said Mike Gusha, Manager of Quality Systems for Lockheed and the industry team lead for the AS9003 rewrite effort. "The rewrite of AS9003 was an industry effort and involved representatives from original equipment manufacturers and NASA. I can't say enough about the support we received from the rewrite team."

Federal Acquisition Regulations

Subpart 46.2 -- Contract Quality Requirements

46.201 -- General.

(a) The contracting officer shall include in the solicitation and contract the **appropriate** quality requirements. The type and extent of contract quality requirements needed depends on the particular acquisition and may range from inspection at time of acceptance to a requirement for the contractor's implementation of a comprehensive program for controlling quality.

Federal Acquisition Regulations

46.203 -- Criteria for Use of Contract Quality Requirements.

The **extent** of contract quality requirements, including contractor inspection, required under a contract shall usually be based upon the classification of the contract item (supply or service) as determined by… its complexity, and the criticality of its application.

(b) Complexity.

(1) Complex items have quality characteristics, not wholly visible in the end item, for which contractual conformance must be established progressively through precise measurements, tests, and controls applied during purchasing, manufacturing, performance, assembly, and functional operation either as an individual item or in conjunction with other items.

(2) Noncomplex items have quality characteristics for which simple measurement and test of the end item are sufficient to determine conformance to contract requirements.

(c) Criticality.

(1) A critical application of an item is one in which the failure of the item could injure personnel or jeopardize a vital agency mission.

Regulatory Flexibility Act

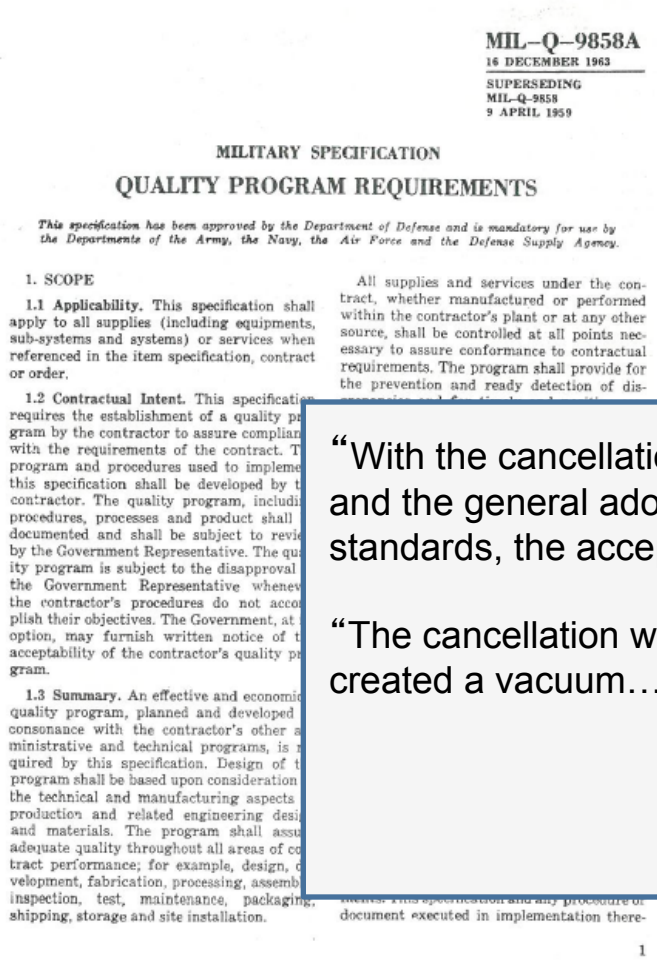
as amended by

Small Business Regulatory Enforcement Fairness Act

Each initial regulatory flexibility analysis shall also contain a description of any significant alternatives to the proposed rule which accomplish the stated objectives of applicable statutes and which minimize any significant economic impact of the proposed rule on small entities. Consistent with the stated objectives of applicable statutes, the analysis shall discuss significant alternatives such as–

(a) the establishment of differing compliance or reporting requirements or timetables that take into account the resources available to small entities;

Mil-Q / Mil-I



MIL–Q–9858A
16 DECEMBER 1963
SUPERSEDING
MIL–Q–9858
9 APRIL 1959

MILITARY SPECIFICATION

QUALITY PROGRAM REQUIREMENTS

This specification has been approved by the Department of Defense and is mandatory for use by the Departments of the Army, the Navy, the Air Force and the Defense Supply Agency.

1. SCOPE

1.1 Applicability. This specification shall apply to all supplies (including equipments, sub-systems and systems) or services when referenced in the item specification, contract or order.

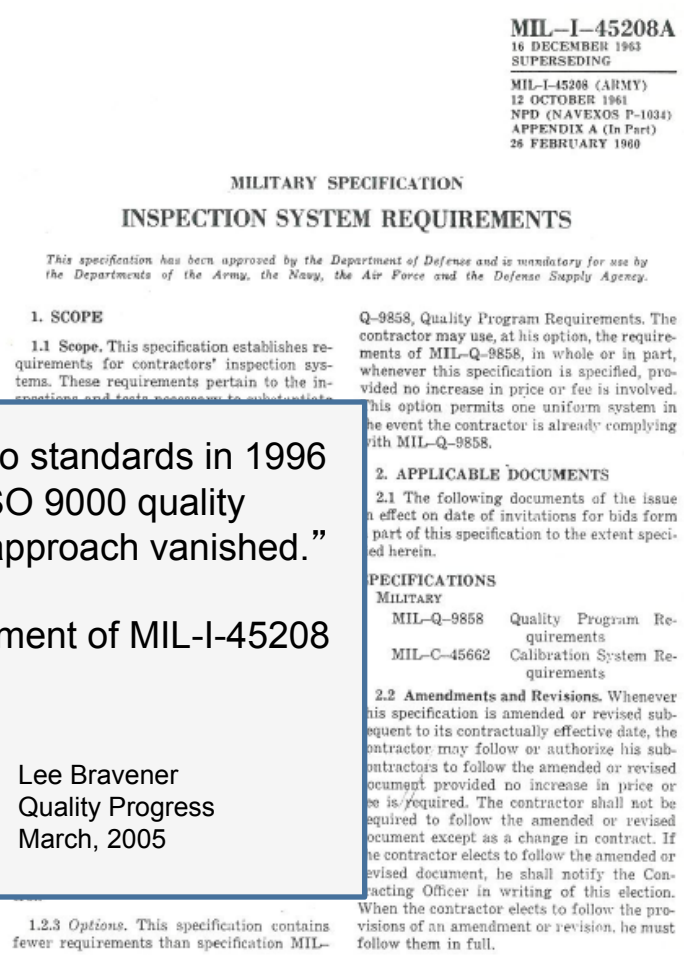
1.2 Contractual Intent. This specification requires the establishment of a quality pr gram by the contractor to assure complian with the requirements of the contract. T program and procedures used to impleme this specification shall be developed by t contractor. The quality program, includi procedures, processes and product shall documented and shall be subject to revie by the Government Representative. The qu ity program is subject to the disapproval the Government Representative whenev the contractor's procedures do not acco plish their objectives. The Government, at option, may furnish written notice of t acceptability of the contractor's quality pr gram.

1.3 Summary. An effective and economic quality program, planned and developed consonance with the contractor's other a ministrative and technical programs, is r quired by this specification. Design of t program shall be based upon consideration the technical and manufacturing aspects production and related engineering desi and materials. The program shall assu adequate quality throughout all areas of co tract performance; for example, design, d velopment, fabrication, processing, assemb inspection, test, maintenance, packaging, shipping, storage and site installation.

All supplies and services under the contract, whether manufactured or performed within the contractor's plant or at any other source, shall be controlled at all points necessary to assure conformance to contractual requirements. The program shall provide for the prevention and ready detection of dis-

document executed in implementation there-

1



MIL–I–45208A
16 DECEMBER 1963
SUPERSEDING
MIL–I–45208 (ARMY)
12 OCTOBER 1961
NPD (NAVEXOS P–1034)
APPENDIX A (In Part)
26 FEBRUARY 1960

MILITARY SPECIFICATION

INSPECTION SYSTEM REQUIREMENTS

This specification has been approved by the Department of Defense and is mandatory for use by the Departments of the Army, the Navy, the Air Force and the Defense Supply Agency.

1. SCOPE

1.1 Scope. This specification establishes requirements for contractors' inspection systems. These requirements pertain to the in-

1.2.3 *Options.* This specification contains fewer requirements than specification MIL-

Q–9858, Quality Program Requirements. The contractor may use, at his option, the requirements of MIL–Q–9858, in whole or in part, whenever this specification is specified, provided no increase in price or fee is involved. This option permits one uniform system in the event the contractor is already complying with MIL–Q–9858.

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on date of invitations for bids form a part of this specification to the extent specified herein.

SPECIFICATIONS

MILITARY

MIL–Q–9858	Quality Program Requirements
MIL–C–45662	Calibration System Requirements

2.2 Amendments and Revisions. Whenever this specification is amended or revised subsequent to its contractually effective date, the contractor may follow or authorize his subcontractors to follow the amended or revised document provided no increase in price or fee is required. The contractor shall not be required to follow the amended or revised document except as a change in contract. If the contractor elects to follow the amended or revised document, he shall notify the Contracting Officer in writing of this election. When the contractor elects to follow the provisions of an amendment or revision, he must follow them in full.

"With the cancellation of these two standards in 1996 and the general adoption of the ISO 9000 quality standards, the accepted two-tier approach vanished."

"The cancellation without replacement of MIL-I-45208 created a vacuum…"

Lee Bravener
Quality Progress
March, 2005

8 ½ pages

4 ½ pages

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The Little Guy

The Little Guy

The Little Guy

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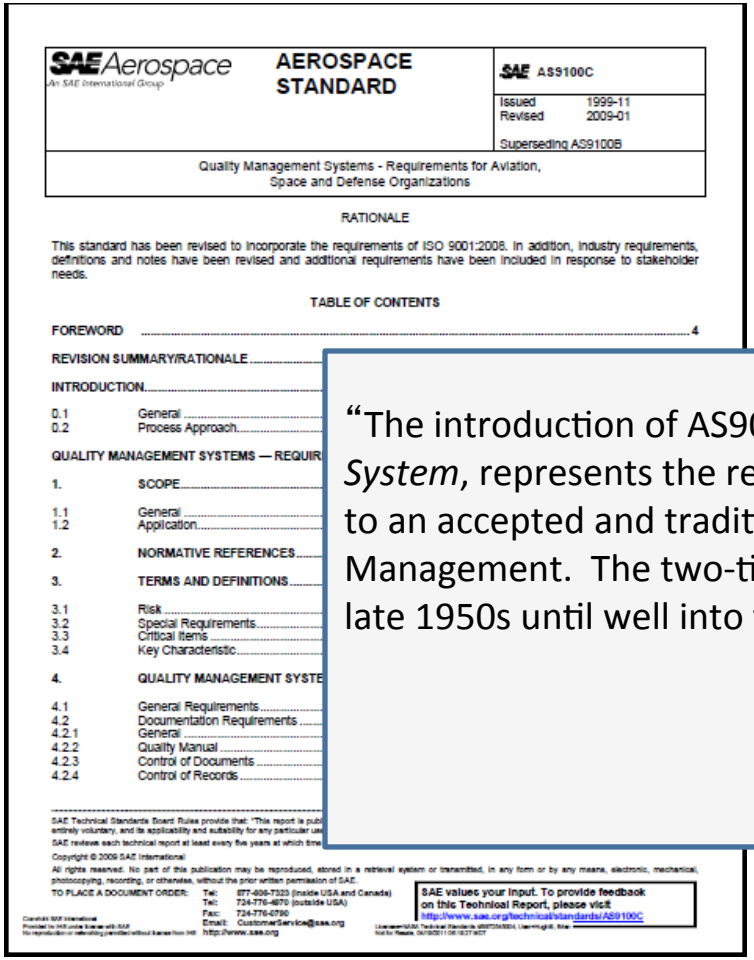
AS9100 / AS9003



SAE Aerospace
An SAE International Group

AEROSPACE STANDARD

SAE AS9100C

Issued 1999-11
Revised 2009-01

Superseding AS9100B

Quality Management Systems - Requirements for Aviation, Space and Defense Organizations

RATIONALE

This standard has been revised to incorporate the requirements of ISO 9001:2008. In addition, industry requirements, definitions and notes have been revised and additional requirements have been included in response to stakeholder needs.

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SAE reviews each technical report at least every five years at which time

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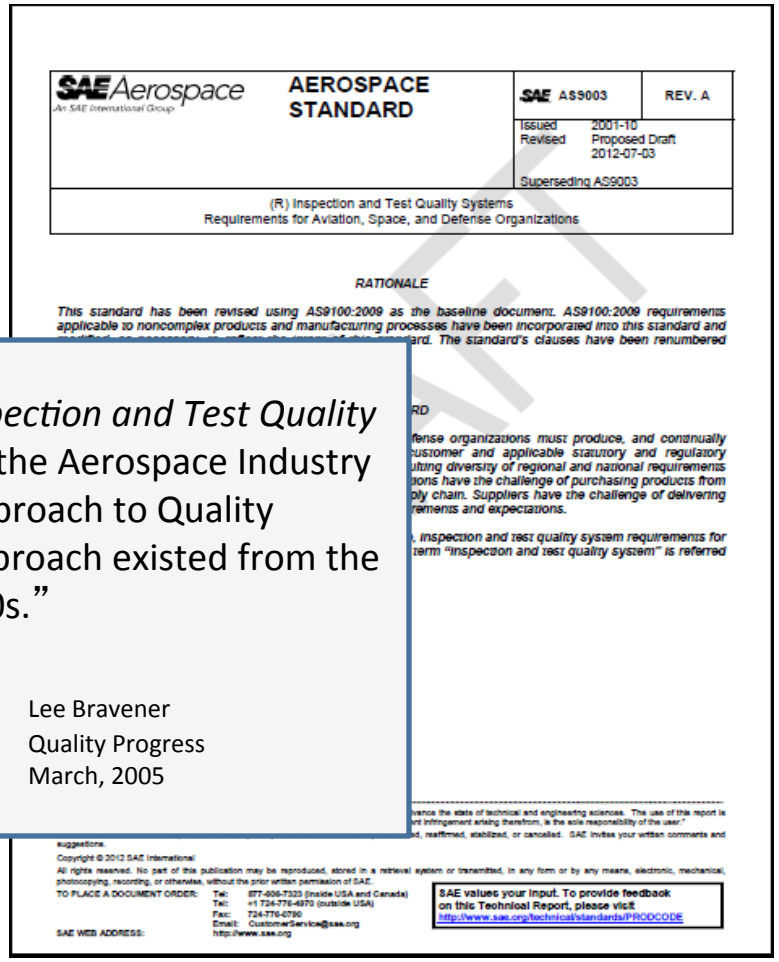
SAE values your input. To provide feedback on this Technical Report, please visit
http://www.sae.org/technical/standards/AS9100C



SAE Aerospace
An SAE International Group

AEROSPACE STANDARD

SAE AS9003 REV. A

Issued 2001-10
Revised Proposed Draft 2012-07-03

Superseding AS9003

(R) Inspection and Test Quality Systems
Requirements for Aviation, Space, and Defense Organizations

RATIONALE

This standard has been revised using AS9100:2009 as the baseline document. AS9100:2009 requirements applicable to noncomplex products and manufacturing processes have been incorporated into this standard and ard. The standard's clauses have been renumbered

RD

fense organizations must produce, and continually customer and applicable statutory and regulatory ulting diversity of regional and national requirements ions have the challenge of purchasing products from ply chain. Suppliers have the challenge of delivering rements and expectations.

, inspection and test quality system requirements for term "inspection and test quality system" is referred

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SAE values your input. To provide feedback on this Technical Report, please visit
http://www.sae.org/technical/standards/PRODCODE

"The introduction of AS9003, *Inspection and Test Quality System*, represents the return by the Aerospace Industry to an accepted and traditional approach to Quality Management. The two-tiered approach existed from the late 1950s until well into the 1990s."

Lee Bravener
Quality Progress
March, 2005

32 Pages

11 Pages

NASA Quality Roadmap

Quality System Requirements for NASA Work					
	AS9100	ISO 9001	AS9003	FAR Inspection Clause(s)	Quality Clauses (ARP 9009)
Critical and Complex	X				X
Complex / Non-Critical		X			X
Critical / Non-complex			X		X
Non-Critical/Non-complex				X	X

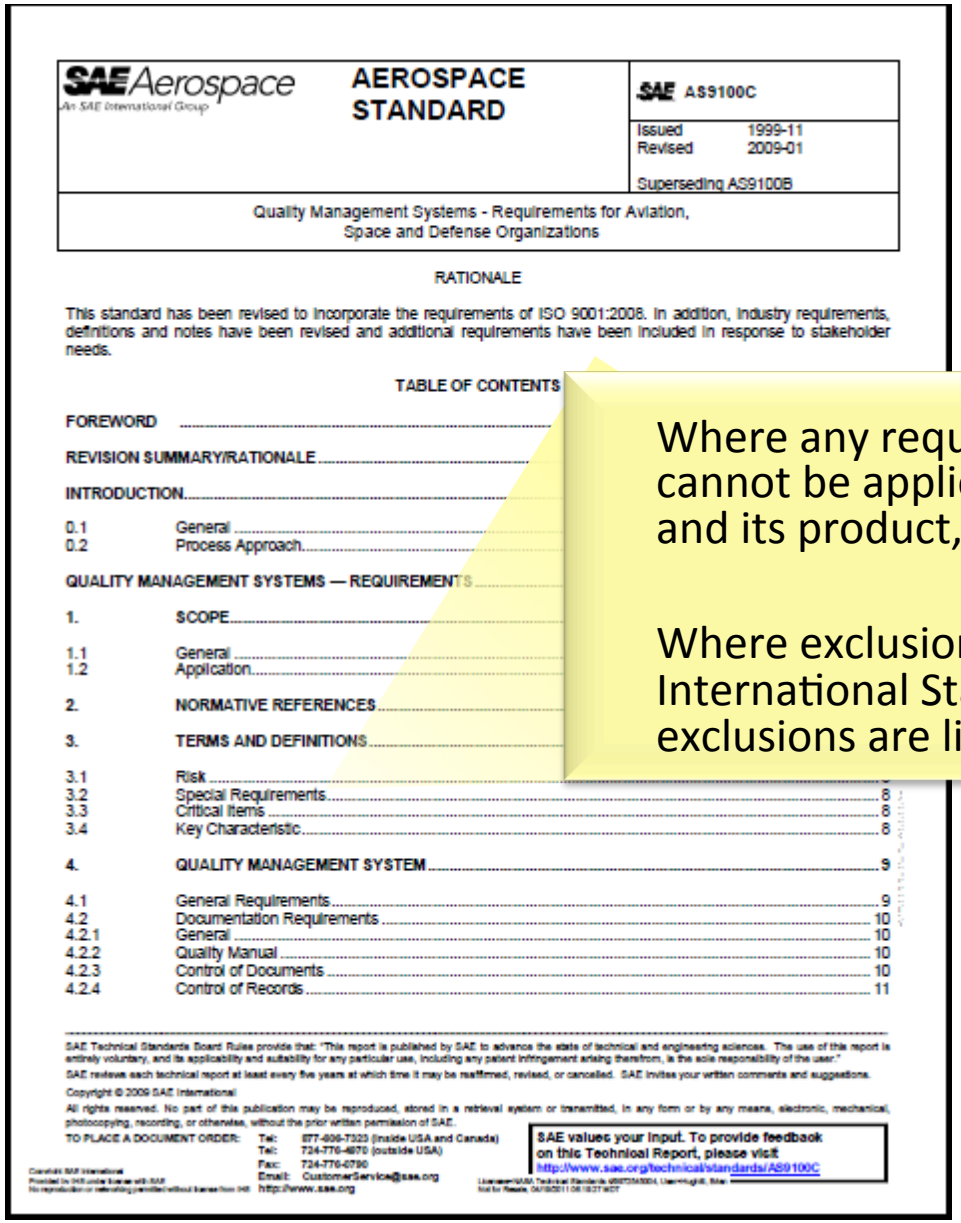
The Future of AS9003:

Report by the RMC Leadership Team
Presented by Mike Roberts, RMC Chair

AAQG Meeting – Savannah

June 8, 2005

- ☐ Revise/Rewrite/Upgrade to AS9003A
- ☐ Leave AS9003 alone. Let it exist "as-is"
- ☐ Kill it



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SAE AS9100C

Issued 1999-11
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AS9100 Exclusion Clause

Where any requirement(s) of this International Standard cannot be applied due to the nature of an organization and its product, this can be considered for exclusion.

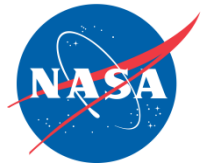
Where exclusions are made, claims of conformity to this International Standard are not acceptable unless these exclusions are limited to requirements within Clause 7…

AS9100 Tailoring

Who Do You Trust?

- ☐ Your organization
- ☐ Lower-Tier Suppliers

AS9100C Clause Seven



SAE AS9003 Application

This standard is intended for use by organizations that produce non-complex products for use in aviation, space, and defense applications. This standard is not intended to apply to organizations that produce complex product or who have design responsibility.

Noncomplex Product

A hardware item whose conformance to quality characteristics can be determined by simple measurement and test of the end item without uneconomical disassembly or destructive testing.

Starting with a Blank Slate

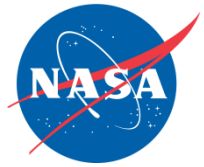
Overview
To ensure the AS9003 Re-write Team kept the right elements of AS9100, the team created a list of all areas required for an inspection and test system (left hand column). The team then mapped the elements to the AS9100 document. Finally, the team ensured they retained the sections in the AS9100 that met the minimum elements.

General:

- Design is Not Applicable
- Need to procure parts and materials to manufacture end item
- Need planning process for test and inspection
- Need production and fabrication
- Need verification of item configuration (Inspect and test)

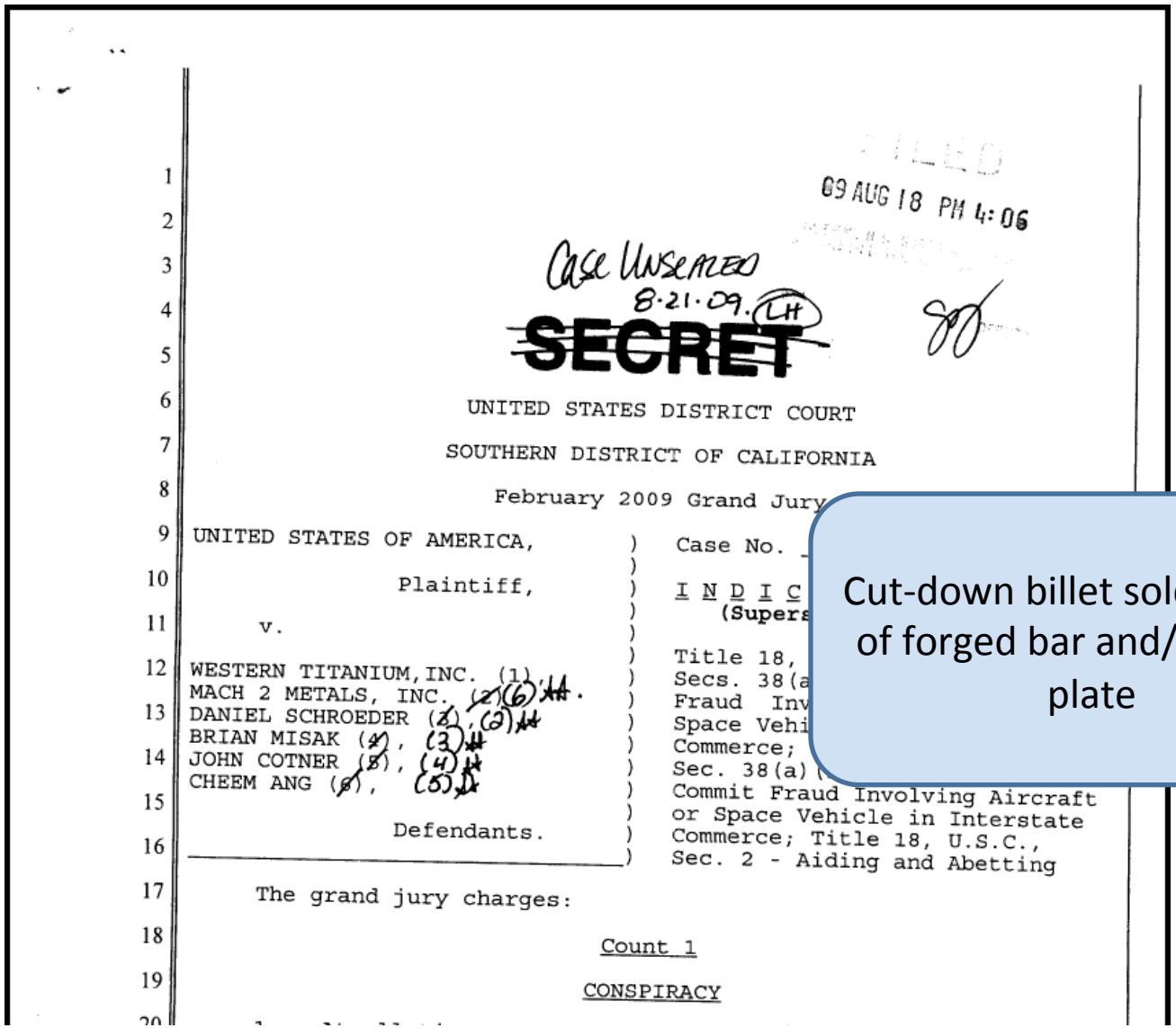
Minimum Elements (high-level) of a Quality Management System for Inspection and Test	AS9100 Paragraph
Overarching	
Management Responsibility (accountability/responsibility)	5
Quality manual	4.2.2
Competency/ Qualification of personnel	6.2
Contract review – capability to perform contract o Ensure they have resources (personnel, materials, etc) to commit to contract	7.2
Document control /Records	4.2.3, 4.2.4
Internal Audit	8.2.2
Life cycle of item	
Identification of key characteristics	7.1 (the words key characteristics are not included)
Identification of test and inspection to verify key characteristics	7.1
Purchasing of raw materials and parts • Qualified suppliers (supplier give you what you ask for)	7.4, 7.4.3

AS9003A Contents



AS9003A Technical Requirement Not Contained in AS9100

"Where the certification test reports are utilized to verify purchased product, the organization shall assure that data in the reports is acceptable per applicable specifications. For raw materials that may be used in critical item applications, the organization shall independently validate the accuracy of test reports in accordance with a statistically meaningful sampling plan."



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Case Unsealed
8-21-09. LH

SECRET

UNITED STATES DISTRICT COURT

SOUTHERN DISTRICT OF CALIFORNIA

February 2009 Grand Jury

UNITED STATES OF AMERICA,

Plaintiff,

v.

WESTERN TITANIUM, INC. (1),
MACH 2 METALS, INC. (2) (6) ##.
DANIEL SCHROEDER (3), (2) ##
BRIAN MISAK (4), (3) ##
JOHN COTNER (5), (4) ##
CHEEM ANG (6), (5) ##

Defendants.

Case No. _

I N D I C
(Supers

Title 18,
Secs. 38(a
Fraud Inv
Space Vehi
Commerce;
Sec. 38(a)
Commit Fraud Involving Aircraft or Space Vehicle in Interstate Commerce; Title 18, U.S.C., Sec. 2 - Aiding and Abetting

The grand jury charges:

Count 1

CONSPIRACY

Cut-down billet sold in place of forged bar and/or rolled plate

Titanium Processing

Ingot Fabrication

Conversion to Billet

Final Processing

Fabrication process for aerospace quality titanium plate or bar:

1. Fabrication of an ingot:

   Molten metal poured into mold, allowed to solidify

2. Conversion of ingot into billets:

   Partially-forged, semi-finished products created as feedstock for final processing (not intended for use in aerospace applications)

3. Final mechanical working to bar or plate:

   Finished products intended for use in aerospace systems: plate is rolled; bar can be forged or rolled

IAQG QMS Standard for non complex products (based on AS9003)

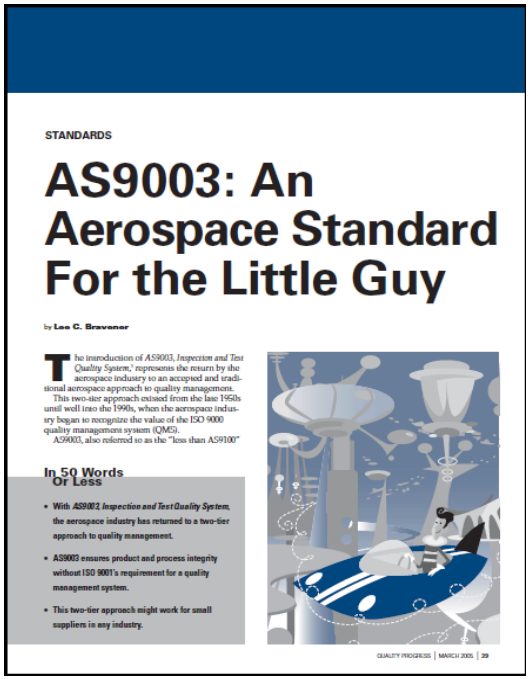
Question :

Do we need to launch a new initiative for an IAQG QMS Standard for non complex products ? (such as AS9003)

- ARGUMENT PRO:
  - Required by NASA and certain US prime contractors
  - Supported by US Defense Agencies (Navy, Air Force, Army), who are still invoking MIL-I-45208
  - AAQG Initiative already launched with AS9003
  - In Defense sector : AQAP 2130 exists (similar to AS9003)
  - Standardizes non-complex supplier QMS requirements (eliminates risk of inadequate AS9100 tailoring by sub-tiers)
  - Reduced cost
  - Larger % of aerospace supply base working to formal QMS

What do you think?

Would a small supplier with limited resources be more likely to deliver conforming product utilizing a comprehensive QMS or more limited Test & Inspection system?



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QUALITY PROGRESS | MARCH 2005 | 29

"The aerospace industry has long accepted the assumption that not all aerospace suppliers should be required to implement a full QMS **or that the customer would always receive substantial benefit from such a specified obligation**."

Where would you want the supplier to devote its limited resources ?

If it was your money, what would you be willing to pay for ?