

ELEVATING INTO THE AVIATION, SPACE & DEFENSE INDUSTRY

Presented by Gene Morrison

**Soar to new heights, open additional markets and business
opportunities**



AGENDA



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01

BENEFITS OF UPGRADING TO AS 9100 D (ROI)

Quality Management System for the Aviation,
Space, and Defense Industry



BENEFITS OF UPGRADING TO AS9100D (ROI)

- Increased output and opportunity, with less scrap and rework
- Provides a consistent approach to satisfying business needs and customer requirements while continually improving your business systems and processes.
- Improved focus on your suppliers and the effect they have on your success.
- Focus on monitoring business and process performance at all levels throughout the organization making sure planned results of continual improvement are being achieved or corrective actions are being taken. (reduce waste in time, resources and materials/products)
- Identify and mitigate intrinsic risk in your operations, supply chain and management systems
- Helps businesses establish robust management systems and processes that are best practices across multiple industries and contribute to building a better business.
- Internationally recognized standard which acts as a testament to your business' QMS and product/service quality, ensuring customers of your sufficient quality practices



BENEFITS OF UPGRADING TO AS9100D (ROI)

- Increased customer/employee satisfaction
- Decrease in customer/outside audits
- Reduce risks of counterfeit parts
- Aviation, Space and Defense (ASD) Customers may require certification. One standard for all of their suppliers is a tremendous cost saving initiative and assurance of quality.
- ISO 9001:2015 is the base of the new AS 9100 revision. AS 9100 draws many principles from ISO 9001:2015, but it is more specific and rigorous due to the high of precision required.
 - Current certified ISO 9001:2015 companies are approximately 75% complete to conforming to AS 9100D
- Expands your customer base and expand to a multi billion dollar global industry.
- Certification audits are conducted by unbiased, independent auditors whose job is to help you improve your QMS and save money.

BENEFITS TO UPGRADING TO AS9100



- Aviation, Space and Defense (ASD) Customers require certification as the minimum requirements to enter this market. Having one standard for all of their suppliers is a tremendous cost savings and assurance of quality they can rely on.
- AS 9100 certification takes you to a higher level of readiness to do business in the Aviation, Space and Defense industries that Includes ISO 9001 as it's foundation.
- You can get more customers! Tap into the \$674 Billion (USD) Aviation and Defense sectors or the \$350 Billion Space Industry.
 - US Senate recently approved \$700 billion defense budget for 2018
- Morgan Stanley projects Space Industry to grow 300% (to \$1.1 Trillion) in 2 decades¹
- Certification audits are conducted by unbiased, independent auditors with no personal interest in the organization they are auditing. Our job is to help you improve your QMS and save money! We focus on cost, schedule and performance.
- There are approximately 1.2 to 7 million parts per aircraft. One or many of those parts could come from your company.

1. <https://www.cnbc.com/2017/10/12/morgan-stanley-how-to-invest-in-1-trillion-space-industry.html>

2. <https://www2.deloitte.com/global/en/pages/manufacturing/articles/gx-mnfg-aerospace-and-defense-finan-performance.html>

3. <https://www2.deloitte.com/global/en/pages/manufacturing/articles/global-a-and-d-outlook.html>

4. <https://www2.deloitte.com/us/en/pages/about-deloitte/articles/press-releases/global-commercial-backlog.html>

02

**ASD MARKET POTENTIAL
AND OPPORTUNITIES**



ASD MARKET POTENTIAL AND OPPORTUNITIES



Over the past decade, backlog orders have doubled and as of the 2017 US aerospace and defense sector export and labor market study by Deloitte, there are 13,687 aircraft in backlog industry-wide awaiting, parts, service, and production – an all-time high². Roughly 95% of the \$1.9 trillion in backlog belongs to Boeing and Airbus³

- Plastic and metal manufacturers producing parts for the automotive, heavy machinery, or construction industry may have the capability to produce parts for the Aerospace industry as well.
- A company who specifies their service in software testing and test automation may be able to apply those same testing and service offerings to Aviation systems.
- Safety device manufacturers (such as seat belts and airbags) who supply to the automotive industry can also produce those products or similar products for aircraft.
- Manufacturers who already serve multiple industries such as Medical Device, Energy, or Transportation industries will be able to expand. Into the Aviation, Space and Defense industries.

ASD MARKET POTENTIAL AND OPPORTUNITIES



- Electronics Manufacturers who produce navigation systems, entertainment systems, or diagnostic systems will be able to certify that their product works and is not disruptive to operations during flight, therefore meeting sufficient quality standards.
- Companies that can design and 3D print components and parts as well as those can support carbon fiber textiles will be of great use to the aerospace industry, who is consistently seeking to reduce weight and increase fuel efficiency in aircraft.
- Medical and Automotive testing companies can use many of the same processes and much of the same equipment to test aerospace parts and the aircraft themselves.
- Software design companies are in increased demand as operations, controls and technology are moving towards automation and digital services. AS 9100's quality standard and supplier verification requirements cut down on risk of cyber threats

03

INTERTEK INCENTIVES FOR UPGRADING





INTERTEK INCENTIVES FOR UPGRADING

- Discounts on a 2 Day GAP Analysis to measure your level of readiness.
- Discounts on training courses including the 3 Day Internal Auditor and 5 Day Lead Auditor courses.
- Discounts on the stage 1, document review.
- IAQG reference materials to provide a detailed understanding of the changes in the new standards.
- Intertek white papers on the changes and steps to be taken to achieve success.
- Intertek's global reach with a large network of auditors world wide to service your global needs.
- Sharing Intertek's current client list of AS9100 businesses that may become new customers and suppliers for you.
- Consistent delivery of our audit services with precision, pace, passion, and expertise.
- **Call for a quote now and find out how the discounts will help you achieve success at the lowest possible cost.**

04

**INTRODUCTION TO
INTERTEK'S ASD PROGRAM**



INTRODUCTION TO INTERTEK'S ASD PROGRAM



Intertek is a leading quality solutions provider to industries worldwide, including the Aviation, Space and Defense sectors.

From auditing and inspection, to testing, training, advisory, quality assurance and certification, Intertek adds value for its customers by improving the quality and safety of their products, assets and processes.

With a network of more than 1,000 laboratories and offices and over 40,000 people in more than 100 countries, Intertek supports companies' success in a global marketplace, by helping customers to meet end users' expectations for safety, sustainability, performance, integrity and desirability in virtually any market worldwide.

Footprint:

Approximately 500 certificates / sites certified to AS9100, 9110 and 9120 globally.



INTRODUCTION TO INTERTEK'S ASD PROGRAM

Resources:

Over Sixty (60) highly competent, industry experienced and customer focused Lead Auditors (AEA's) auditing AS9100, 9110 and 9120 standards globally. This staff includes full time employees and dedicated contractors.

By the Numbers:

- **3rd** largest Testing, Inspection, and Certification company in the world
- **20** years as an accredited management systems certification body
- **230** industry sectors for which we hold accreditation
- **1,000+** auditors in our global network
(**60 ASD+ Global, (34 USA and 6 in Canada)**
(Avg. industry exp. 24+ Years, Avg. 3rd party exp. 12+ years)
- **50,000+** management systems certificates issued worldwide
- **500+** AS certs registered

INTRODUCTION TO INTERTEK'S ASD PROGRAM



Partnership:

We're dedicated to supporting you at every stage of your upgrade to AS9100 to achieve success and to continually improve your business systems and processes.

Intertek Audit Approach:

Listen and Learn - understand your culture, people, processes and what you are looking for from your 3rd party audits.

Tailor our audit approach based on your business needs at Corporate level and then assuring objectives and targets are set and being met in various countries and at various sites that achieves what the organization expects.

Focus on measuring process efficiency - best possible performance, least waste of time and effort; instead of just process effectiveness - adequate performance to achieve objective or target. Always focus on improvement!

Fair and honest reporting focusing on process details to allow you to make better management decisions and improve the RCCA process. Focus on our clients greatest areas of business risk based on product / process and management system complexity at various sites. No rubber stamping! Challenge the status quo.

05

KEY DIFFERENCES BETWEEN ISO 9001 AND AS9100



ISO 9001:2015 VERSUS AS 9100 D



ISO 9001:2015	AS 9100 D
0 Introduction	0 Introduction
1 Scope	1 Scope
2 Normative references	2 Normative references
3 Terms and definitions	3 Terms and definitions



SPECIFIC DIFFERENCES BETWEEN ISO 9001:2015 AND AS 9100 REV D

1 – 3.2

1. Scope

This standard includes ISO 9001:2015² quality management system requirements and specifies additional aviation, space, and defense industry requirements, definitions, and notes.

It is emphasized that the requirements specified in this standard are complementary (not alternative) to customer and applicable statutory and regulatory requirements.

If there is a conflict between the requirements of this standard and customer or applicable statutory or regulatory requirements, the latter shall take precedence.

2. Normative References

ISO 9001:2015 Quality management systems – Requirements

3. Terms and Definitions

3.1 Counterfeit Part - An unauthorized copy, imitation, substitute, or modified part (e.g., material, part, component), which is knowingly misrepresented as a specified genuine part of an original or authorized manufacturer. **NOTE:** Examples of a counterfeit part can include, but are not limited to, the false identification of marking or labeling, grade, serial number, date code, documentation, or performance characteristics.

3.2 Critical Items - Those items (e.g., functions, parts, software, characteristics, processes) having significant effect on the provision and use of the products and services; including safety, performance, form, fit, function, producibility, service life, etc.; that require specific actions to ensure they are adequately managed. Examples of critical items include safety critical items, fracture critical items, mission critical items, key characteristics, etc.



SPECIFIC DIFFERENCES BETWEEN ISO 9001:2015 AND AS 9100 REV D

3.3 – 3.5

3.3 Key Characteristic - An attribute or feature whose variation has a significant effect on product fit, form, function, performance, service life, or producibility, that requires specific actions for the purpose of controlling variation.

3.4 Product Safety - The state in which a product is able to perform to its designed or intended purpose without causing unacceptable risk of harm to persons or damage to property.

3.5 Special Requirements - Those requirements identified by the customer, or determined by the organization, which have high risks of not being met, thus requiring their inclusion in the operational risk management process. Factors used in the determination of special requirements include product or process complexity, past experience, and product or process maturity. Examples of special requirements include performance requirements imposed by the customer that are at the limit of the industry's capability, or requirements determined by the organization to be at the limit of its technical or process capabilities.

NOTE: Special requirements (3.5) and critical items (3.2), along with key characteristics (3.3), are interrelated. Special requirements are identified when determining and reviewing requirements related to the product (see 8.2.2 and 8.2.3). Special requirements can require the identification of critical items. Design output (see 8.3.5) can include identification of critical items that require specific actions to ensure they are adequately managed. Some critical items will be further classified as key characteristics because their variation needs to be controlled.

ISO 9001:2015 VERSUS AS 9100 D



ISO 9001:2015	AS 9100 D
4 Context of the organization	4 Context of the organization
4.1 Understanding the organization and its context	4.1 Understanding the organization and its context
4.2 Understanding the needs and expectations of interested parties	4.2 Understanding the needs and expectations of interested parties
4.3 Determining the scope of the quality management system	4.3 Determining the scope of the quality management system
4.4 Quality management system and its processes	4.4 Quality management system and its processes
5 Leadership	5 Leadership
5.1 Leadership and commitment	5.1 Leadership and commitment
5.1.1 General	5.1.1 General
5.1.2 Customer focus	5.1.2 Customer focus
5.2 Policy	5.2 Policy
5.2.1 Establishing the quality policy	5.2.1 Establishing the quality policy
5.2.2 Communicating the quality policy	5.2.2 Communicating the quality policy
5.3 Organizational roles, responsibilities and authorities	5.3 Organizational roles, responsibilities and authorities



SPECIFIC DIFFERENCES BETWEEN ISO 9001:2015 AND AS 9100 REV D

4.4.1 – 4.4.2

4.4 Quality Management System and Its Processes

4.4.1

The organization's quality management system shall also address customer and applicable statutory and regulatory quality management system requirements.

4.4.2

The organization's quality management system shall also address customer and applicable statutory and regulatory quality management system requirements.

The organization shall establish and maintain documented information that includes: – a general description of relevant interested parties (see 4.2 a);

- the scope of the quality management system, including boundaries and applicability (see 4.3);
- a description of the processes needed for the quality management system and their application throughout the organization;
- the sequence and interaction of these processes;
- assignment of the responsibilities and authorities for these processes.

NOTE: The above description of the quality management system can be compiled into a single source of documented information and referred to as a quality manual.



SPECIFIC DIFFERENCES BETWEEN ISO 9001:2015 AND AS 9100 REV D

5.1.2 - 5.3

5.1.2 Customer Focus

d. product and service conformity and on-time delivery performance are measured and appropriate action is taken if planned results are not, or will not be, achieved.

5.3 Organizational Roles, Responsibilities, and Authorities

Top management shall appoint a specific member of the organization's management, identified as the management representative, who shall have the responsibility and authority for oversight of the above requirements.

The management representative shall have the organizational freedom and unrestricted access to top management to resolve quality management issues.

NOTE: The responsibility of a management representative can include liaison with external parties on matters relating to the quality management system.

ISO 9001:2015 VERSUS AS 9100 D



ISO 9001:2015	AS 9100 D
6 Planning	6 Planning
6.1 Actions to address risks and opportunities	6.1 Actions to address risks and opportunities
6.2 Quality objectives and planning to achieve them	6.2 Quality objectives and planning to achieve them
6.3 Planning of changes	6.3 Planning of changes
7 Support	7 Support
7.1 Resources	7.1 Resources
7.1.1 General	7.1.1 General
7.1.2 People	7.1.2 People
7.1.3 Infrastructure	7.1.3 Infrastructure
7.1.4 Environment for the operation of processes	7.1.4 Environment for the operation of processes
7.1.5 Monitoring and measuring resources	7.1.5 Monitoring and measuring resources
7.1.5.1 General	7.1.5.1 General
7.1.5.2 Measurement Traceability	7.1.5.2 Measurement Traceability
7.1.6 Organizational knowledge	7.1.6 Organizational knowledge
7.2 Competence	7.2 Competence
7.3 Awareness	7.3 Awareness



SPECIFIC DIFFERENCES BETWEEN ISO 9001:2015 AND AS 9100 REV D

7.1.5.2 – 7.3

7.1.5.2 Measurement Traceability

The organization shall establish, implement, and maintain a process for the recall of monitoring and measuring equipment requiring calibration or verification.

The organization shall maintain a register of the monitoring and measuring equipment. The register shall include the equipment type, unique identification, location, and the calibration or verification method, frequency, and acceptance criteria.

NOTE: Monitoring and measuring equipment can include, but are not limited to: test hardware, test software, automated test equipment (ATE), and plotters used to produce verification data. It also includes personally owned and customer supplied equipment used to provide evidence of product and service conformity.

Calibration or verification of monitoring and measuring equipment shall be carried out under suitable environmental conditions (see 7.1.4).

7.2 Competence

d. **NOTE:** Consideration should be given for the periodic review of the necessary competence.

7.3 Awareness

- e. relevant quality management system documented information and changes thereto;
- f. their contribution to product or service conformity;
- g. their contribution to product safety;
- h. the importance of ethical behavior.

ISO 9001:2015 VERSUS AS 9100 D



ISO 9001:2015	AS 9100 D
7 Support (continued)	7 Support (continued)
7.4 Communication	7.4 Communication
7.5 Documented information 7.5.1 General 7.5.2 Creating and updating 7.5.3 Control of documented information	7.5 Documented information 7.5.1 General 7.5.2 Creating and updating 7.5.3 Control of documented information
8 Operation	8 Operation
8.1 Operational planning and control	8.1 Operational planning and control 8.1.1 Operational risk management 8.1.2 Configuration management 8.1.3 Product safety 8.1.4 Prevention of counterfeit parts
8.2 Requirements for products and services 8.2.1 Customer communication 8.2.2 Determining the requirements for products and services 8.2.3 Review of requirements for products and services 8.2.4 Changes to requirements for products and services	8.2 Requirements for products and services 8.2.1 Customer communication 8.2.2 Determining the requirements for products and services 8.2.3 Review of requirements for products and services 8.2.4 Changes to requirements for products and services



SPECIFIC DIFFERENCES BETWEEN ISO 9001:2015 AND AS 9100 REV D

7.4 – 7.5.3.2

7.4 Communication

NOTE: Communication should include internal and external feedback relevant to the quality management system.

7.5.2 Creating and Updating

NOTE: Approval implies authorized persons and approval methods are identified for the relevant types of documented information, as determined by the organization.

7.5.3.2

For the control of documented information, the organization shall address the following activities, as applicable:

e. prevention of the unintended use of obsolete documented information by removal or by application of suitable identification or controls if kept for any purpose.

When documented information is managed electronically, data protection processes shall be defined (e.g., protection from loss, unauthorized changes, unintended alteration, corruption, physical damage).



SPECIFIC DIFFERENCES BETWEEN ISO 9001:2015 AND AS 9100 REV D

8.1

8.1 Operational Planning and Control

a. **NOTE:** Determination of requirements for the products and services should include consideration of: – personal and product safety;

- producibility and inspectability;
- reliability, availability, and maintainability;
- suitability of parts and materials used in the product;
- selection and development of embedded software;
- product obsolescence;
- prevention, detection, and removal of foreign objects;
- handling, packaging, and preservation;
- recycling or final disposal of the product at the end of its life.

b. **NOTE:** According to the nature of the product and depending on the specified requirements, statistical techniques can be used to support:

- design verification (e.g., reliability, maintainability, product safety);
- process control;
 - selection and verification of key characteristics;
 - process capability measurements;
 - statistical process control;
 - design of experiments;
- verification;
- failure mode, effects, and criticality analysis.

c. ...and to meet on-time delivery of products and services;



SPECIFIC DIFFERENCES BETWEEN ISO 9001:2015 AND AS 9100 REV D

8.1 (CONTINUED)

8.1 Operational Planning and Control (continued)

- f. determining the processes and controls needed to manage critical items, including production process controls when key characteristics have been identified;
- g. engaging representatives of affected organization functions for operational planning and control;
- h. determining the process and resources to support the use and maintenance of the products and services;
- i. determining the products and services to be obtained from external providers;
- j. establishing the controls needed to prevent the delivery of nonconforming products and services to the customer.

NOTE: One method to achieve operational planning and control can be through using integrated phased processes.

As appropriate to the organization, customer requirements, and products and services, the organization shall plan and manage product and service provision in a structured and controlled manner including scheduled events performed in a planned sequence to meet requirements at acceptable risk, within resource and schedule constraints.

NOTE: This activity is generally referred to as project planning, project management, or program management.

NOTE: As an output of this planning, documented information specifying the processes of the quality management system and the resources to be applied to a specific product, service, project, or contract can be referred to as a quality plan.

The organization shall establish, implement, and maintain a process to plan and control the temporary or permanent transfer of work, to ensure the continuing conformity of the work to requirements. The process shall ensure that work transfer impacts and risks are managed.

NOTE: For the control of work transfer from the organization to an external provider, or from an external provider to another external provider, see 8.4. For the control of work transfer from one organization facility to another, or from an external provider to the organization, see 8.5.



SPECIFIC DIFFERENCES BETWEEN ISO 9001:2015 AND AS 9100 REV D

8.1.1

8.1.1 Operational Risk Management

The organization shall plan, implement, and control a process for managing operational risks to the achievement of applicable requirements, which includes as appropriate to the organization and the products and services:

- a. assignment of responsibilities for operational risk management;
- b. definition of risk assessment criteria (e.g., likelihood, consequences, risk acceptance);
- c. identification, assessment, and communication of risks throughout operations;
- d. identification, implementation, and management of actions to mitigate risks that exceed the defined risk acceptance criteria;
- e. acceptance of risks remaining after implementation of mitigating actions.

NOTE 1: While clause 6.1 addresses the risks and opportunities when planning for the quality management system of the organization, the scope of this clause (8.1.1) is limited to the risks associated to the operational processes needed for the provision of products and services (clause 8).

NOTE 2: Within the aviation, space, and defense industry, risk is generally expressed in terms of the likelihood of occurrence and the severity of the consequences.

SPECIFIC DIFFERENCES BETWEEN ISO 9001:2015 AND AS 9100 REV D

8.1.2



8.1.2 Configuration Management

The organization shall plan, implement, and control a process for configuration management as appropriate to the organization and its products and services in order to ensure the identification and control of physical and functional attributes throughout the product lifecycle. This process shall:

- a. control product identity and traceability to requirements, including the implementation of identified changes;
- b. ensure that the documented information (e.g., requirements, design, verification, validation and acceptance documentation) is consistent with the actual attributes of the products and services.



SPECIFIC DIFFERENCES BETWEEN ISO 9001:2015 AND AS 9100 REV D

8.1.3 – 8.1.4

8.1.3 Product Safety

The organization shall plan, implement, and control the processes needed to assure product safety during the entire product life cycle, as appropriate to the organization and the product.

NOTE: Examples of these processes include:

- assessment of hazards and management of associated risks (see 8.1.1);
- management of safety critical items;
- analysis and reporting of occurred events affecting safety;
- communication of these events and training of persons.

8.1.4 Prevention of Counterfeit Parts

The organization shall plan, implement, and control processes, appropriate to the organization and the product, for the prevention of counterfeit or suspect counterfeit part use and their inclusion in product(s) delivered to the customer.

NOTE: Counterfeit part prevention processes should consider:

- training of appropriate persons in the awareness and prevention of counterfeit parts;
- application of a parts obsolescence monitoring program;
- controls for acquiring externally provided product from original or authorized manufacturers, authorized distributors, or other approved sources;
- requirements for assuring traceability of parts and components to their original or authorized manufacturers;
- verification and test methodologies to detect counterfeit parts;
- monitoring of counterfeit parts reporting from external sources;
- quarantine and reporting of suspect or detected counterfeit parts.



SPECIFIC DIFFERENCES BETWEEN ISO 9001:2015 AND AS 9100 REV D

8.2.2 – 8.2.3.1

8.2.2 Determining the Requirements for Products and Services

- c. special requirements of the products and services are determined;
- d. operational risks (e.g., new technology, ability and capacity to provide, short delivery time frame) have been identified.

8.2.3.1

This review shall be coordinated with applicable functions of the organization.

If upon review the organization determines that some customer requirements cannot be met or can only partially be met, the organization shall negotiate a mutually acceptable requirement with the customer.

ISO 9001:2015 VERSUS AS 9100 D



ISO 9001:2015	
8 Operation (continued)	
8.3 Design and development of products and services <ul style="list-style-type: none">8.3.1 General8.3.2 Design and development planning8.3.3 Design and development inputs8.3.4 Design and development controls8.3.5 Design and development outputs8.3.6 Design and development changes	8.3 Design and development of products and services <ul style="list-style-type: none">8.3.1 General8.3.2 Design and development planning8.3.3 Design and development inputs8.3.4 Design and development controls8.3.5 Design and development outputs8.3.6 Design and development changes
8.4 Control of externally provided products and services <ul style="list-style-type: none">8.4.1 General8.4.2 Type and extent of control8.4.3 Information for external providers	8.4 Control of externally provided products and services <ul style="list-style-type: none">8.4.1 General8.4.2 Type and extent of control8.4.3 Information for external providers



SPECIFIC DIFFERENCES BETWEEN ISO 9001:2015 AND AS 9100 REV D

8.3.2 – 8.3.4

8.3.2 Design and Development Planning

When appropriate, the organization shall divide the design and development effort into distinct activities and, for each activity, define the tasks, necessary resources, responsibilities, design content, and inputs and outputs.

Design and development planning shall consider the ability to provide, verify, test and maintain products and services (reference output of 8.1 a).

8.3.3 Design and Development Inputs

f. when applicable, the potential consequences of obsolescence (e.g., materials, processes, components, equipment, products).

NOTE: The organization can also consider as design and development inputs other information such as benchmarking, external provider feedback, internally generated data, and in-service data.

8.3.4 Design and Development Controls

g. progression to the next stage is authorized.

Participants in design and development reviews shall include representatives of functions concerned with the design and development stage(s) being reviewed.

SPECIFIC DIFFERENCES BETWEEN ISO 9001:2015 AND AS 9100 REV D

8.3.4.1



8.3.4.1

When tests are necessary for verification and validation, these tests shall be planned, controlled, reviewed, and documented to ensure and prove the following:

- test plans or specifications identify the test item being tested and the resources being used, define test objectives and conditions, parameters to be recorded and relevant acceptance criteria;
- test procedures describe the test methods to be used, how to perform the test, and how to record the results;
- the correct configuration of the test item is submitted for the test;
- the requirements of the test plan and the test procedures are observed;
- the acceptance criteria are met.

Monitoring and measuring devices used for testing shall be controlled as defined in clause 7.1.5.

At the completion of design and development, the organization shall ensure that reports, calculations, test results, etc., are able to demonstrate that the design for the product or service meets the specification requirements for all identified operational conditions.



SPECIFIC DIFFERENCES BETWEEN ISO 9001:2015 AND AS 9100 REV D

8.3.5 – 8.3.6

8.3.5 Design and Development Outputs

- e. specify, as applicable, any critical items, including any key characteristics, and specific actions to be taken for these items;
- f. are approved by authorized person(s) prior to release.

The organization shall define the data required to allow the product to be identified, manufactured, verified, used, and maintained.

NOTE: Data can include:

- the drawings, part lists, and specifications necessary to define the configuration and the design features of the product;
- the material, process, manufacturing, assembly, handling, packaging, and preservation data needed to provide and maintain a conforming product or service;
- the technical data and repair schemes for operating and maintaining the product.

8.3.6 Design and Development Changes

The organization shall implement a process with criteria for notifying its customer, prior to implementation, about changes that affect customer requirements.

Design and development changes shall be controlled in accordance with the configuration management process requirements.

SPECIFIC DIFFERENCES BETWEEN ISO 9001:2015 AND AS 9100 REV D

8.4.1



8.4.1 General

The organization shall be responsible for the conformity of all externally provided processes, products, and services, including from sources defined by the customer.

The organization shall ensure, when required, that customer-designated or approved external providers, including process sources (e.g., special processes), are used.

The organization shall identify and manage the risks associated with the external provision of processes, products, and services, as well as the selection and use of external providers.

The organization shall require that external providers apply appropriate controls to their direct and sub-tier external providers, to ensure that requirements are met.

NOTE: During external provider evaluation and selection, the organization can use quality data from objective and reliable external sources, as evaluated by the organization (e.g., information from accredited quality management system or process certification bodies, external provider approvals from government authorities or customers). Use of such data would be only one element of an organization's external provider control process and the organization remains responsible for verifying that externally provided processes, products, and services meet specified requirements.



SPECIFIC DIFFERENCES BETWEEN ISO 9001:2015 AND AS 9100 REV D

8.4.1.1

8.4.1.1

The organization shall:

- a. define the process, responsibilities, and authority for the approval status decision, changes of the approval status, and conditions for a controlled use of external providers depending on their approval status;
- b. maintain a register of its external providers that includes approval status (e.g., approved, conditional, disapproved) and the scope of the approval (e.g., product type, process family);
- c. periodically review external provider performance including process, product and service conformity, and on-time delivery performance;
- d. define the necessary actions to take when dealing with external providers that do not meet requirements;
- e. define the requirements for controlling documented information created by and/or retained by external providers.



SPECIFIC DIFFERENCES BETWEEN ISO 9001:2015 AND AS 9100 REV D

8.4.2

8.4.2 Type and Extent of Control

3. the results of the periodic review of external provider performance (see 8.4.1.1 c);

Verification activities of externally provided processes, products, and services shall be performed according to the risks identified by the organization. These shall include inspection or periodic testing, as applicable, when there is high risk of nonconformities including counterfeit parts.

NOTE 1: Customer verification activities performed at any level of the supply chain does not absolve the organization of its responsibility to provide acceptable processes, products, and services and to comply with all requirements.

NOTE 2: Verification activities can include:

- review of objective evidence of the conformity of the processes, products, and services from the external provider (e.g., accompanying documentation, certificate of conformity, test documentation, statistical documentation, process control documentation, results of production process verification and assessment of changes to the production process thereafter);
- inspection and audit at the external provider's premises;
- review of the required documentation;
- review of production part approval process data;
- inspection of products or verification of services upon receipt;
- review of delegations of product verification to the external provider.



SPECIFIC DIFFERENCES BETWEEN ISO 9001:2015 AND AS 9100 REV D

8.4.2 (CONTINUED) – 8.4.3

8.4.2 Type and Extent of Control (Continued)

When externally provided product is released for production use pending completion of all required verification activities, it shall be identified and recorded to allow recall and replacement if it is subsequently found that the product does not meet requirements.

When the organization delegates verification activities to the external provider, the scope and requirements for delegation shall be defined and a register of delegations shall be maintained. The organization shall periodically monitor the external provider's delegated verification activities.

When external provider test reports are utilized to verify externally provided products, the organization shall implement a process to evaluate the data in the test reports to confirm that the product meets requirements. When a customer or organization has identified raw material as a significant operational risk (e.g., critical items), the organization shall implement a process to validate the accuracy of test reports.

8.4.3 Information for External Providers

- a. including the identification of relevant technical data (e.g., specifications, drawings, process requirements, work instructions);
- g. design and development control;
- h. special requirements, critical items, or key characteristics;



SPECIFIC DIFFERENCES BETWEEN ISO 9001:2015 AND AS 9100 REV D

8.4.3 (CONTINUED)

8.4.3 Information for External Providers (Continued)

- i. test, inspection, and verification (including production process verification);
- j. the use of statistical techniques for product acceptance and related instructions for acceptance by the organization;
- k. the need to: – implement a quality management system;
 - use customer-designated or approved external providers, including process sources (e.g., special processes);
 - notify the organization of nonconforming processes, products, or services and obtain approval for their disposition;
 - prevent the use of counterfeit parts (see 8.1.4);
 - notify the organization of changes to processes, products, or services, including changes of their external providers or location of manufacture, and obtain the organization’s approval;
 - flow down to external providers applicable requirements including customer requirements;
 - provide test specimens for design approval, inspection/verification, investigation, or auditing; – retain documented information, including retention periods and disposition requirements;
- i. the right of access by the organization, their customer, and regulatory authorities to the applicable areas of facilities and to applicable documented information, at any level of the supply chain;
- m. ensuring that persons are aware of:
 - their contribution to product or service conformity;
 - their contribution to product safety;
 - the importance of ethical behavior.

ISO 9001:2015 VERSUS AS 9100 D



ISO 9001:2015	
8 Operation (continued)	
8.5 Product and service provision <ul style="list-style-type: none"> 8.5.1 Control of production and service provision 8.5.2 Identification and traceability 8.5.3 Property belonging to customer or external providers 8.5.4 Preservation 8.5.5 Post-delivery activities 8.5.6 Control of changes 	8.5 Product and service provision <ul style="list-style-type: none"> 8.5.1 Control of production and service provision <ul style="list-style-type: none"> 8.5.1.1 Control of equipment, tools, software, programs 8.5.1.2 Validation and control of special processes 8.5.1.3 Production process verification 8.5.2 Identification and traceability 8.5.3 Property belonging to customer or external providers 8.5.4 Preservation 8.5.5 Post-delivery activities 8.5.6 Control of changes
8.6 Release of products and services	8.6 Release of products and services
8.7 Control of nonconforming outputs	8.7 Control of nonconforming outputs
9 Performance evaluation	9 Performance evaluation
9.1 Monitoring, measurement, analysis and evaluation <ul style="list-style-type: none"> 9.1.1 General 9.1.2 Customer satisfaction 9.1.3 Analysis and evaluation 	9.1 Monitoring, measurement, analysis and evaluation <ul style="list-style-type: none"> 9.1.1 General 9.1.2 Customer satisfaction 9.1.3 Analysis and evaluation

SPECIFIC DIFFERENCES BETWEEN ISO 9001:2015 AND AS 9100 REV D

8.5.1



8.5.1 Control of production and service provision

a. the availability of documented information that defines:

2. the results to be achieved;

NOTE 1: Documented information that defines characteristics of products and services can include digital product definition data, drawings, parts lists, materials, and process specifications.

NOTE 2: Documented information for activities to be performed and results to be achieved can include process flow charts, control plans, production documents (e.g., manufacturing plans, travelers, routers, work orders, process cards), and verification documents.

c. the implementation of monitoring and measurement activities at appropriate stages to verify that criteria for control of processes or outputs, and acceptance criteria for products and services, have been met;

1. ensuring that documented information for monitoring and measurement activity for product acceptance includes:

- criteria for acceptance and rejection;
- where in the sequence verification operations are to be performed;
- measurement results to be retained (at a minimum an indication of acceptance or rejection);
- any specific monitoring and measurement equipment required and instructions associated with their use;

2. ensuring that when sampling is used as a means of product acceptance, the sampling plan is justified on the basis of recognized statistical principles and appropriate for use (i.e., matching the sampling plan to the criticality of the product and to the process capability).

d. NOTE: Suitable infrastructure can include product specific tools (e.g., jigs, fixtures, molds) and software programs.

f. NOTE: These processes can be referred to as special processes (see 8.5.1.2).



SPECIFIC DIFFERENCES BETWEEN ISO 9001:2015 AND AS 9100 REV D

8.5.1 (CONTINUED) – 8.5.1.1

8.5.1 Control of production and service provision (continued)

- i. the establishment of criteria for workmanship (e.g., written standards, representative samples, illustrations);
- j. the accountability for all products during production (e.g., parts quantities, split orders, nonconforming product);
- k. the control and monitoring of identified critical items, including key characteristics, in accordance with established processes;
- l. the determination of methods to measure variable data (e.g., tooling, on-machine probing, inspection equipment);
- m. the identification of in-process inspection/verification points when adequate verification of conformity cannot be performed at later stages;
- n. the availability of evidence that all production and inspection/verification operations have been completed as planned, or as otherwise documented and authorized;
- o. the provision for the prevention, detection, and removal of foreign objects;
- p. the control and monitoring of utilities and supplies (e.g., water, compressed air, electricity, chemical products) to the extent they affect conformity to product requirements (see 7.1.3);
- q. the identification and recording of products released for subsequent production use pending completion of all required measuring and monitoring activities, to allow recall and replacement if it is later found that the product does not meet requirements.

8.5.1.1 Control of Equipment, Tools, and Software Programs

Equipment, tools, and software programs used to automate, control, monitor, or measure production processes shall be validated prior to final release for production and shall be maintained.

Storage requirements shall be defined for production equipment or tooling in storage including any necessary periodic preservation or condition checks.



SPECIFIC DIFFERENCES BETWEEN ISO 9001:2015 AND AS 9100 REV D

8.5.1.2 – 8.5.1.3

8.5.1.2 Validation and Control of Special Processes

For processes where the resulting output cannot be verified by subsequent monitoring or measurement, the organization shall establish arrangements for these processes including, as applicable:

- a. definition of criteria for the review and approval of the processes;
- b. determination of conditions to maintain the approval;
- c. approval of facilities and equipment;
- d. qualification of persons;
- e. use of specific methods and procedures for implementation and monitoring the processes;
- f. requirements for documented information to be retained.

8.5.1.3 Production Process Verification

The organization shall implement production process verification activities to ensure the production process is able to produce products that meet requirements.

NOTE: These activities can include risk assessments, capacity studies, capability studies, and control plans.

The organization shall use a representative item from the first production run of a new part or assembly to verify that the production processes, production documentation, and tooling are able to produce parts and assemblies that meet requirements. This activity shall be repeated when changes occur that invalidate the original results (e.g., engineering changes, production process changes, tooling changes).

NOTE: This activity can be referred to as First Article Inspection (FAI).

The organization shall retain documented information on the results of production process verification.



SPECIFIC DIFFERENCES BETWEEN ISO 9001:2015 AND AS 9100 REV D

8.5.2 – 8.5.4

8.5.2 Production Process Verification

The organization shall maintain the identification of the configuration of the products and services in order to identify any differences between the actual configuration and the required configuration.

When acceptance authority media are used (e.g., stamps, electronic signatures, passwords), the organization shall establish controls for the media.

NOTE: Traceability requirements can include:

- the identification to be maintained throughout the product life;
- the ability to trace all products manufactured from the same batch of raw material, or from the same manufacturing batch, to the destination (e.g., delivery, scrap);
- for an assembly, the ability to trace its components to the assembly and then to the next higher assembly;
- for a product, a sequential record of its production (manufacture, assembly, inspection/verification) to be retrievable.

8.5.4 Preservation

Preservation of outputs shall also include, when applicable in accordance with specifications and applicable statutory and regulatory requirements, provisions for:

- a. cleaning;
- b. prevention, detection, and removal of foreign objects;
- c. special handling and storage for sensitive products;
- d. marking and labeling, including safety warnings and cautions;
- e. shelf life control and stock rotation;
- f. special handling and storage for hazardous materials.



SPECIFIC DIFFERENCES BETWEEN ISO 9001:2015 AND AS 9100 REV D

8.5.5 – 8.6

8.5.5 Post-Delivery Activities

- f. collection and analysis of in-service data (e.g., performance, reliability, lessons learned);
- g. control, updating, and provision of technical documentation relating to product use, maintenance, repair, and overhaul;
- h. controls required for work undertaken external to the organization (e.g., off-site work);
- i. product/customer support (e.g., queries, training, warranties, maintenance, replacement parts, resources, obsolescence).

When problems are detected after delivery, the organization shall take appropriate action including investigation and reporting.

8.5.6 Control of Changes

Persons authorized to approve production or service provision changes shall be identified.

NOTE: Production or service provision changes can include the changes affecting processes, production equipment, tools, or software programs.

8.6 Release of Products and Services

When required to demonstrate product qualification, the organization shall ensure that retained documented information provides evidence that the products and services meet the defined requirements.

The organization shall ensure that all documented information required to accompany the products and services are present at delivery.



SPECIFIC DIFFERENCES BETWEEN ISO 9001:2015 AND AS 9100 REV D

8.7 – 9.1.3

8.7 Control of Nonconforming Outputs

8.7.1

NOTE: The term “nonconforming outputs” includes nonconforming product or service generated internally, received from an external provider, or identified by a customer.

The organization’s nonconformity control process shall be maintained as documented information including the provisions for:

- defining the responsibility and authority for the review and disposition of nonconforming outputs and the process for approving persons making these decisions;
- taking actions necessary to contain the effect of the nonconformity on other processes, products, or services;
- timely reporting of nonconformities affecting delivered products and services to the customer and to relevant interested parties;
- defining corrective actions for nonconforming products and services detected after delivery, as appropriate to their impacts (see 10.2).



SPECIFIC DIFFERENCES BETWEEN ISO 9001:2015 AND AS 9100 REV D

8.7 – 9.1.3 (CONTINUED)

NOTE: Interested parties requiring notification of nonconforming products and services can include external providers, internal organizations, customers, distributors, and regulatory authorities.

d. obtaining authorization for acceptance under concession by a relevant authority and, when applicable, by the customer.

Dispositions of use-as-is or repair for the acceptance of nonconforming products shall only be implemented:

- after approval by an authorized representative of the organization responsible for design or by persons having delegated authority from the design organization;
- after authorization by the customer, if the nonconformity results in a departure from the contract requirements.

Product dispositioned for scrap shall be conspicuously and permanently marked, or positively controlled, until physically rendered unusable.

Counterfeit, or suspect counterfeit, parts shall be controlled to prevent reentry into the supply chain.

9.1.2 Customer Satisfaction

Information to be monitored and used for the evaluation of customer satisfaction shall include, but is not limited to, product and service conformity, on-time delivery performance, customer complaints, and corrective action requests. The organization shall develop and implement plans for customer satisfaction improvement that address deficiencies identified by these evaluations, and assess the effectiveness of the results.

9.1.3 Analysis and Evaluation

NOTE: Appropriate data can include information on product and service problems reported by external sources (e.g., government/industry alerts, advisories).

ISO 9001:2015 VERSUS AS 9100 D



ISO 9001:2015	
9 Performance evaluation (continued)	9 Performance evaluation (continued)
9.2 Internal Audit	9.2 Internal Audit
9.3 Management review 9.1.1 General 9.1.2 Management review inputs 9.1.3 Management review outputs	9.3 Management review 9.3.1 General 9.3.2 Management review inputs 9.3.3 Management review outputs
10 Improvement	10 Improvement
10.1 General	10.1 General
10.2 Nonconformity and corrective action	10.2 Nonconformity and corrective action
10.3 Continual improvement	10.3 Continual improvement



SPECIFIC DIFFERENCES BETWEEN ISO 9001:2015 AND AS 9100 REV D

9.2 – 10.2

9.2 Internal Audit

9.2.1

NOTE: The organization's own requirements should include customer and applicable statutory and regulatory quality management system requirements.

9.3.2 Management Review Inputs

8. on-time delivery performance;

9.3.3 Management Review Outputs

d. risks identified.

10.2 Nonconformity and Corrective Action

10.2.1 When a nonconformity occurs, including any arising from complaints, the organization shall:

b. evaluate the need for action to eliminate the cause(s) of the nonconformity, in order that it does not recur or occur elsewhere, by:

2. determining the causes of the nonconformity, including, as applicable, those related to human factors;

g. flow down corrective action requirements to an external provider when it is determined that the external provider is responsible for the nonconformity;

h. take specific actions when timely and effective corrective actions are not achieved.

The organization shall maintain documented information that defines the nonconformity and corrective action management processes.

SPECIFIC DIFFERENCES BETWEEN ISO 9001:2015 AND AS 9100 REV D

10.3



10.3 Continual Improvement

The organization shall monitor the implementation of improvement activities and evaluate the effectiveness of the results.

NOTE: Examples of continual improvement opportunities can include lessons learned, problem resolutions, and the benchmarking of best practices.

06

**INTERTEK REFERRAL
NETWORK**



REFERRAL PROGRAM



- 500+ AS Clients/ Certificates/ Sites Certified by Intertek
- Opportunity to work with Intertek clients to form new partnerships, and customer/supplier relationships

An opportunity to identify new customers and suppliers from our list of certified clients globally.

07

**ADDITIONAL INTERTEK
SERVICES TO AID IN YOUR
SUCCESS**



TRAINING AND AUDIT OPTIONS



Intertek Aerospace Training Courses

AS 9100D Internal Auditor Training Course	3 Day - Overview of the Rev D requirements, auditing using AS9101F forms with hands on workshops and instructor lead discussions.	
AS 9100D Lead Auditor Training Course	5 Day - Includes Internal Auditor material. Also reviews nonconformities, audit follow-up and registration process.	
Root Cause Analysis and Process Approach Webinars	<p style="text-align: center;">Root Cause Analysis</p> <p style="text-align: center;">2 Hours – Risk mitigation techniques. Understand, correct, and avoid problems.</p>	<p style="text-align: center;">Process Approach; Use of A Turtle Diagram</p> <p style="text-align: center;">2 Hours - Creating a process plan and identifying your customers, your inputs, outputs and risks.</p>
2 Day ISO 9001:2015 Overview Course	2 Day - Review of the 2015 standard with discussions, and hands on workshops. Helps create a base for Auditing.	
5 Day IRCA QMS Lead Auditor Training Course	5 Day - Much more in depth ISO 9001 auditing course with a test at the end. Fulfills the training requirements for IRCA.	

SUPPORT



2-day GAP Analysis

Identify any weaknesses and gaps in your current QMS with sufficient details to provide a roadmap for conformance.

Additionally, Intertek will observe current organizational structure in accordance with the new requirements of revision D.

Thought leadership

Whitepapers

Webinars

Open line to Intertek Experts

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08

**WHAT AS 9100 D CAN DO
TO TRANSFORM YOUR
COMPANY -
RECAP OF BENEFITS AND ROI**

Return on Investment and Expanded Market



WHAT AS 9100 D CAN DO TO TRANSFORM YOUR COMPANY

- Minimize your business risk by auditing your business processes and identifying areas of weakness, non conformance and best practices so that you achieve success as a Aviation, Space and Defense supplier.
- Aviation, Space and Defense (ASD) Customers may require certification. Because one standard for all of their suppliers is a tremendous cost savings and assurance of quality they can rely on.
- Certification audits are conducted by unbiased, independent auditors with no personal interest in the organization they are auditing. Our job is to help you improve your QMS and save money!
- Internal Benefits and cost savings by reducing waste and inefficiency in your business processes.
- You can get more customers! Tap into the \$674 Billion (USD) Aviation and Defense sectors or the \$350 Billion Space Industry.
- Morgan Stanley projects Space Industry to grow 300% (to \$1.1 Trillion) in 2 decades
- Certification audits are conducted by unbiased, independent auditors with no personal interest in the organization they are auditing. Our job is to help you improve your QMS and save money! We focus on cost, schedule and performance.
- There are approximately 1.2 to 7 million parts per aircraft. One or many of those parts could come from your company.

BENEFITS AND ROI



According to NYU Stern school of business⁴, Aerospace firms averaged a net margin of +7.15%.

Over the past decade, backlog orders have doubled and as of the 2017 US aerospace and defense sector export and labor market study by Deloitte, there are 13,687 aircraft in backlog industry-wide awaiting, parts, service, and production – an all-time high². Roughly 95% of the \$1.9 trillion in backlog belongs to Boeing and Airbus³

Defense spending is on an upward trend, projected 3.2% growth in 2017². (US Senate approved \$700 billion defense budget for 2018)

A need for diverse and unique parts opens the door for companies to adjust their production to supply the Aerospace industry. From a piece in the engine, to a button on an entertainment console in the cabin and everything in between, the opportunity for your product to reach a new and profitable market is closer than you may think.

1. <https://www2.deloitte.com/global/en/pages/manufacturing/articles/gx-mnfg-aerospace-and-defense-finan-performance.html>

2. <https://www2.deloitte.com/global/en/pages/manufacturing/articles/global-a-and-d-outlook.html>

3. <https://www2.deloitte.com/us/en/pages/about-deloitte/articles/press-releases/global-commercial-backlog.html>

4. http://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/margin.html



BENEFITS OF UPGRADING TO AS9100D (ROI)

- Increased output and opportunity, with less scrap and rework
- Provides a consistent approach to satisfying business needs and customer requirements while continually improving your business systems and processes.
- Improved focus on your suppliers and the effect they have on your success.
- Focus on monitoring business and process performance at all levels throughout the organization making sure planned results of continual improvement are being achieved or corrective actions are being taken. (reduce waste in time, resources and materials/products)
- Identify and mitigate intrinsic risk in your operations, supply chain and management systems
- Helps businesses establish robust management systems and processes that are best practices across multiple industries and contribute to building a better business.
- Internationally recognized standard which acts as a testament to your business' QMS and product/service quality, ensuring customers of your sufficient quality practices



BENEFITS OF UPGRADING TO AS9100D (ROI)

- Increased customer/employee satisfaction
- Decrease in customer/outside audits
- Reduce risks of counterfeit parts
- Aviation, Space and Defense (ASD) Customers may require certification. One standard for all of their suppliers is a tremendous cost saving initiative and assurance of quality.
- ISO 9001:2015 is the base of the new AS 9100 revision. AS 9100 draws many principles from ISO 9001:2015, but it is more specific and rigorous due to the high of precision required.
- Expands your customer base and expand to a multi billion dollar global industry.
- Certification audits are conducted by unbiased, independent auditors whose job is to help you improve your QMS and save money.

09

UPGRADE / TRANSITION PROCESS





UPGRADE / TRANSITION PROCESS

First Step, Call and/or meet with one of our Business Development Managers and begin the process

Second Step, Provide Details (Size Type Expertise Product/Service) of your organization

Third Step, Quotation and Contract from our Business Development Managers

Fourth Step, Perform a 2-day GAP Analysis if requested

Fifth Step, Stage 1 – Formal Document Review (say what you do?)

Sixth Step, Stage 2 – Initial Audit (do what you say?) look at objective evidence of implementation of the standard requirements within your Quality Management System

Seventh Step, Perform a Tech Review on the Audit Documentation

Eighth Step, **Issue AS 9100 D Certificate and open new markets for your organization.**

10

CONTACT US

The Next Steps



CONTACT US



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intertek

Total Quality. Assured.