Welcome & Introductions

160+ Individuals Registered from 14 Countries
AESQ Supplier Forums

Typically held twice a year, rotating around North America, Europe and Asia

AESQ Supplier Forums provide an opportunity to:

- Provide updates on the work of the AESQ
- Share best practices
- Provide feedback to the AESQ
- Develop a network of practitioners and Subject Matter Experts
AESQ Supplier Forums: Focus on AS13100 Deployment

Introducing AS13100: AESQ Quality Management Requirements

The AESQ AS13100 Quality Management System Requirements for Aerospace Engine Design and Production Organizations are designed to ensure quality throughout the aerospace engine supply chain. This standard sets out to create a common set of supplemental requirements with common training and reference manuals to improve understanding, efficiency, and performance. While significantly simplifying the business of suppliers with aviation companies, the primary intent of this new standard is to improve customer quality by focusing on the key systems and processes needed to deliver consistent aerospace engine products.

These common supplemental requirements aim to raise the bar for quality and performance in these key areas, and therefore elevate standards to ensure safety in these sectors.

To ensure customer satisfaction, the aviation, space, and aerospace industries have to produce and continuously improve safe, reliable products that support our customers. In today’s global environment, this requirement is more important than ever in this industry and the resulting diversity of organizational and cultural experiences. The AS13100 helps to improve SAE product organizations by providing a collaborative framework for achieving the quality and safety integration of aerospace components. It promotes world-class standards to satisfy customer needs by ensuring quality expectations and requirements are met.

Learn more: www.sae.org/standards/content/AS13100/

AESQ – Aerospace Engine Supplier Quality Strategy Group

This document slide does not contain ITAR or EAR technical data. The content of this presentation slide is proprietary and confidential information of the AESQ. It is not permitted to be distributed to any third party without the written consent of the AESQ.
Housekeeping

Today's event is being recorded and will be available on the AESQ website for viewing
Emergency procedures

Building evacuation
The Primary Gathering Point for a building evacuation (Fire) is the Light Pole in the parking lot closest to I 75 marked with YELLOW, ORANGE, and RED at the top of the pole.

The Secondary Gathering Point for a building evacuation is the Grassy Area to the North between the Learning Centre and Gate 50.

Tornado shelter
The location of the Tornado Shelter for the Learning Centre is the Bldg. 501 Basement. Bldg. 501 is the RED BRICK building directly behind or East of the Learning Centre. Emergency gates will open near the North East and South East exits of the Learning Centre if there is a tornado warning issued. You may also exit past the kitchen.
# Agenda

<table>
<thead>
<tr>
<th>Topic</th>
<th>Presenter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Welcome &amp; Introductions</td>
<td><strong>Barbara Negroe</strong>, Executive Sourcing Quality Leader, GE Aviation</td>
</tr>
<tr>
<td>GE Aerospace Welcome Address</td>
<td><strong>Paul Stadelmann</strong>, Acting GM Global Quality, GE Aerospace</td>
</tr>
<tr>
<td>AESQ Overview, Vision &amp; Objectives</td>
<td><strong>Lisa Claveloux</strong>, Sr. Director, Quality, Pratt &amp; Whitney</td>
</tr>
<tr>
<td>AS13100 Standard Overview</td>
<td><strong>Larry Bennett</strong>, Consulting Engineer, Global Sourcing Quality, GE Aerospace</td>
</tr>
<tr>
<td>Deployment &amp; Transition to AS13100</td>
<td><strong>Jim Wilson</strong>, Sr. Manager, Supplier Quality, &amp; Development, Pratt &amp; Whitney Canada &lt;br&gt; <strong>Earl Capozzi</strong>, Associate Director, Discipline Chief, Quality &amp; Process Engineering/Supplier Quality, Pratt &amp; Whitney</td>
</tr>
<tr>
<td><strong>BREAK – 20 MINUTES</strong></td>
<td></td>
</tr>
</tbody>
</table>
## Agenda

<table>
<thead>
<tr>
<th>Topic</th>
<th>Presenter</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Best Practices for Human Factors</strong></td>
<td>Tracey Lockhart, Head of Quality, Manufacturing Engineering and Continuous Improvement, Defense, Rolls-Royce</td>
</tr>
<tr>
<td><strong>Breakout Session #1 – Subject Matter Interest Groups (SMIGs)</strong></td>
<td></td>
</tr>
<tr>
<td>Best Practices for Human Factors</td>
<td></td>
</tr>
<tr>
<td>• APQP &amp; PPAP (RM13145) – Ken Hatcher, Raytheon Technologies</td>
<td></td>
</tr>
<tr>
<td>• Human Factors (RM13010) – Richard Bolingbroke, Timet</td>
<td></td>
</tr>
<tr>
<td>• Defect Prevention (RM13004) – Jim Barge, GE, and Lisa Rioux, Pratt &amp; Whitney</td>
<td></td>
</tr>
<tr>
<td>• Compliance Assessment (RM13009) and Quality Audit Methods (RM13005) – Jim Wilson, Pratt &amp; Whitney,</td>
<td></td>
</tr>
<tr>
<td>• Process Control (RM13006) – Ricardo Banuelas, Head of Continuous Improvement, Rolls-Royce</td>
<td></td>
</tr>
<tr>
<td>• Sub Tier Management (RM13007) – Larry Bennett, GE Aerospace</td>
<td></td>
</tr>
<tr>
<td>• Training – Earl Capozzi, Pratt &amp; Whitney and Shari Pobjecky, SAE</td>
<td></td>
</tr>
<tr>
<td><strong>GROUP PHOTO &amp; LUNCH – 60 MINUTES</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Training Overview</strong></td>
<td>Earl Capozzi, Associate Director, Discipline Chief, Quality &amp; Process Engineering/Supplier Quality, Pratt &amp; Whitney</td>
</tr>
<tr>
<td><strong>Breakout Session #2 – Zero Defects</strong></td>
<td>Lisa Claveloux, Sr. Director, Group Quality, Pratt &amp; Whitney</td>
</tr>
</tbody>
</table>
## Agenda

<table>
<thead>
<tr>
<th>Topic</th>
<th>Presenter</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BREAK – 20 MINUTES</strong></td>
<td></td>
</tr>
<tr>
<td>AS13100 FAQ Panel</td>
<td><strong>MODERATOR:</strong> Barrie Hicklin, Sr. Director, Quality Systems &amp; Regulatory Compliance, Honeywell Aerospace</td>
</tr>
<tr>
<td></td>
<td><strong>PANELISTS:</strong></td>
</tr>
<tr>
<td></td>
<td>Larry Bennett, Consulting Engineer, Global Sourcing Quality, GE Aerospace</td>
</tr>
<tr>
<td></td>
<td>Earl Capozzi, Associate Director, Discipline Chief, Quality &amp; Process Engineering/Supplier Quality, Pratt &amp; Whitney</td>
</tr>
<tr>
<td></td>
<td>Denis Pottier, Head of the Purchasing Quality Assurance Department, Safran Aircraft Engines</td>
</tr>
<tr>
<td></td>
<td>Ricardo Banuelas, Head of Continuous Improvement, Rolls-Royce</td>
</tr>
<tr>
<td>Voice of Customer</td>
<td>Amy Gowder, President &amp; CEO, GE Aerospace Defense and Systems</td>
</tr>
<tr>
<td>AESQ How to Get Involved</td>
<td>Jun Sakai, Chief Engineer, IHI</td>
</tr>
<tr>
<td>Summary &amp; Close</td>
<td>Barbara Negroe, Executive Sourcing Quality Leader, GE Aviation</td>
</tr>
</tbody>
</table>
How to Contribute – Live Poll Questions

How to answer live poll questions:

1. Scan the QR Code on your table
2. Enter the Passcode
3. Answer the Question
4. Add any questions during the day in the Slido App ("Like" a question)
Join at slido.com
#3593254

ⓘ Start presenting to display the joining instructions on this slide.
How to Use Slido Live Polling App?

Answer Live Poll Questions

Add Your Own Questions

“Like” Questions
What is the name of the city where you live?
Have you attended previous AESQ Supplier Forums?
What function are you in?

Start presenting to display the poll results on this slide.
WELCOME ADDRESS

PAUL STADELMANN
ASSEMBLY TEST AND MRO QUALITY LEADER
GE AEROSPACE
GE Aerospace

Quality Overview

March 2023
OUR STRATEGIC FRAMEWORK

OUR PURPOSE

We invent the future of flight, lift people up, and bring them home safely.

OUR VISION

At GE Aerospace, we will be the company that defines flight for today, tomorrow and the future.

OUR PRIORITIES

Develop and empower our people through lean and decentralization
• Safety first always, then Quality, Delivery & Cost
• Fully embed lean principles in our daily work
• Invest in learning and development for our people

Exceed our customers’ expectations
• Support airlines and airframers with the ramp
• Support military partners on capability and readiness
• Be the best partner with ease of doing business

Pioneer the flight technology of today and tomorrow
• Develop technology solutions to better serve the current fleet
• Differentiate ourselves in the future through breakthrough technology
• Create a more sustainable future of flight

OUR BEHAVIORS

Act with Humility    Lead with Transparency    Deliver with Focus
Safety First

Our People

~19% ↓
in injuries at GE Aerospace from 2021 to 2022

Our Products

There are Four Major Components to Our Safety Management System (SMS)

1. Policy (defines objectives, accountabilities)
2. Promotion (safety awareness and training)
3. Risk Management (how is safety risk evaluated and mitigated)
4. Assurance (compliance with safety processes)

The GE Aerospace SMS Objective is to “Bring them home safely.”
Zero Defect Culture
Zero disruptions to our associates, to our partners, and to our customers

Zero Defect Culture
• 2022…35% reduction to our associates, partners, and customers…

A continuing journey to ZDC
• 100% Employee Engagement
• 100% First Time Yield
• 100% On Time Delivery
• 100% Customer Satisfaction

“If we did all the things we are really capable of doing, we would literally astound ourselves.”

- Thomas Edison
Lean Mindset

• Embrace problem solving
• Measure performance through the lens of our customer
• Committed to continuous improvement, always in search of a better way
Powering the world’s airline fleets with more than 39,000 engines

0:02
Every 2 seconds an aircraft with GE engine technology* is taking off somewhere in the world

3/4 takeoffs
Three out of every four takeoffs are powered by GE*

400,000 people
~400,000 people are in the air right now depending on our engines

*Includes joint venture engines built by CFM and Engine Alliance.
CFM is a 50/50 Joint Venture between GE and Safran Aircraft Engines.
Engine Alliance is a 50/50 Joint Venture between GE and PW.
Our Challenge…Deliver Aerospace Products With Flawless Quality on Time

Market Dynamics

I’d rather be good than lucky…Quality is the enabler to meet this challenge.

Risks & Headwinds

- Technical Expertise
- Process Standardization
- Training & Development
- Rate Readiness
- Talent and Attrition
- Management of Change
- Maintenance

(a Source: Oxford Economics
(b Source: US Dept of Defense, Aviation Week forecast, internal GE estimate; addressable market for GE)
AESQ – Aerospace Engine Supplier Quality Strategy Group

This document slide does not contain ITAR or EAR technical data. The content of this presentation slide is proprietary and confidential information of the AESQ. It is not permitted to be distributed to any third party without the written consent of the AESQ.
What prompted AESQ to form? – View From 2013

- Unprecedented production ramp ahead
- Expanding global supplier footprint and increasing supplier engine content
- Common supply base, multiple OEM customers
- Customers required engine OEM’s to improve management of supply base
- Aerospace Engine Supplier Quality [AESQ] group formed to supplement AS9100, and later AS9145, for critical safety nature of engines

Improving Safety & Quality Remained a Key Challenge
AS13100 Overview

Why is AS13100 important

• All engine manufacturers are driving process control through APQP [Advanced Product Quality Planning]

• Despite the same foundational requirements, each were flowing different terminology, processes and tools

• Needed simpler and more consistent guidance for the supply base

• Asked for a forum to share best practices from across industry

• Needed to challenge current acceptance thresholds- raising the bar of performance for the whole industry, ex. product safety

• Essential to accelerate supplier capability through common development & training
AS13100 Overview

Aerospace Engine Supplier Quality Group

Vision

To establish and maintain a common set of Quality Requirements that enable the Global Aero Engine Supply Chain to be truly competitive through lean, capable processes and a culture of Continuous Improvement

Driving to Zero Defects

Guiding Principles

- Simplify & standardize requirements
- Common Quality language
- Build on existing industry standards [AS9100, AS9145]
- Standardized 3rd party training
- Supportive deployment

Cincinnati Thermal Spray
Collins Aerospace
Consolidated Precision Products

Parker Meggitt
Rolled Alloys
Solar Atmospheres
Woodward
AS13100 Overview

Aero Engines requirements flowdown

2013

- Regulator Requirements
- Customer Requirements
- Industry Requirements
  - NADCAP
  - IAQG (AS9100, AS9145, AS9102, etc.)
  - ISO (ISO9001, ISO19011, etc.)

AERO Engine Manufacturers

Rolls-Royce SABRe
GE S-1000
P&W ASQR-01
Safran SAFe

Aero Engine Supply Chain

- Differing supplemental requirements to AS9100 [Regulatory, Customer, business] and guidance albeit with largely the same intent

2023

- Regulator Requirements
- Customer Requirements
- Industry Requirements
  - NADCAP
  - IAQG (AS9100, AS9145, AS9102, etc.)
  - ISO (ISO9001, ISO19011, etc.)

AERO Engine Manufacturers

Aerospace Engine Supplier Quality Management Requirements
(Supplemental Requirements to AS9100 & AS9145)

AERQ Engine Manufacturers

- Creates a common set of supplemental requirements
- Simplifies the compliance for suppliers with multiple customers
- Common reference materials to support understanding, efficiency, and effective deployment of foundational quality tools
AESQ Strategy Group Members

Barbara Negroe
Executive Sourcing Quality Leader
GE Aerospace

Lisa Claveloux
Sr. Director Quality
Pratt & Whitney

Helen Djäknegren
Director Supplier Quality & Development
GKN Aerospace

Uzam Khan
Supplier Quality Executive
Rolls-Royce

Denis Pottier
Head of Purchasing Quality Assurance Department
Safran Aircraft Engines

Barbara Negroe
Executive Sourcing Quality Leader
GE Aerospace

Lisa Claveloux
Sr. Director Quality
Pratt & Whitney

Helen Djäknegren
Director Supplier Quality & Development
GKN Aerospace

Uzam Khan
Supplier Quality Executive
Rolls-Royce

Denis Pottier
Head of Purchasing Quality Assurance Department
Safran Aircraft Engines

Jun Sakai
Chief Engineer
IHI Corporation

Barrie Hicklin
Sr. Director, Quality Systems & Regulatory Compliance
Honeywell

Markus Braig
Director Quality Supply Chain and MRO
MTU Aero Engines

James Clifton
Global Quality Director
Precision Castparts Corp.

Osa Omoruyi
VP Quality
Howmet Engine Systems

AESQ – Aerospace Engine Supplier Quality Strategy Group
This document slide does not contain ITAR or EAR technical data. The content of this presentation slide is proprietary and confidential information of the AESQ. It is not permitted to be distributed to any third party without the written consent of the AESQ.
Defect Prevention Tools Must Work as a System
WHAT DOES SUCCESS LOOK LIKE?

Leaders advocating for process control—speaking the language
Common tool usage, processes control is the way we work
Developing proficiency through common Industry training
Culture of product safety and quality felt into the tiers of the supply base
Continuous Improvement of the AS13100 standard—feedback from supply base, OEM’s, customers

Mindset shift—Belief that zero defects is achievable
AS13100 OVERVIEW
STRUCTURE & KEY HIGHLIGHTS

LARRY BENNETT
CONSULTING ENGINEER, GLOBAL SOURCING QUALITY
SUPPLY CHAIN DIVISION
GE AVIATION
AS13100 Creation Process

Engine Maker Supplier Requirements pre AS13100 introduction

Harmonized Requirements

Requirements

Existing & WIP AESQ Standards

Supporting Guidance & Best Practice Material

Future Engine Maker Supplier Requirements

Overall Number of Requirements reduced by >50%

Starting Point
September 2018

AS13100 Standard

AESQ – Aerospace Engine Supplier Quality Strategy Group
This document slide does not contain ITAR or EAR technical data. The content of this presentation slide is proprietary and confidential information of the AESQ. It is not permitted to be distributed to any third party without the written consent of the AESQ.
## AS13100 Structure

<table>
<thead>
<tr>
<th>AS13100 Requirements</th>
<th>Chapter A ISO9001/AS9100 Rev D Supplemental Requirements</th>
<th>Chapter B APQP &amp; PPAP AS9145 Supplemental Requirements</th>
<th>Chapter C Defect Prevention Quality Tools to Support APQP &amp; PPAP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clause Number</td>
<td>1  2  3  4  5  6  7  8  9  10</td>
<td>1  2  3  4  5  6</td>
<td>DMEA  Process KPs  Process Flow Diagram  PRMEA  Process KPs  Control Plan  MSA  Process Capability</td>
</tr>
</tbody>
</table>

### Example Extract

9.3 Management Review

9.3.1 General Reference 9100D:09/2016 requirements.

9.3.2 Reference 9100D:09/2016 requirements.

9.3.2.1 Management Review Inputs - **Supplemental Requirements**

Management Reviews shall be conducted at least annually and consider the following performance topics:

- Cost of Poor Quality (COPQ).
- Manufacturing / Assembly Right First Time / First Pass Yield.
- Customer scorecards (where available).
- Human Factors reporting.
AS13100 Customer Specific Requirements

Customer Specific requirements are designed to include requirements that could not be harmonized within AS13100. These documents shall:

- Require Compliance to AS13100
- Signpost to Customer Specific Documents (where required)
- Definition of customer specific acceptance thresholds called out in AS13100 e.g., Cpk, GR&R scope, etc.
- Additional Customer Specific requirements not defined within AS13100
- Define company specific key roles and accountabilities for approvals
- Includes specific IT interface requirements
AS13100 Requirement Highlights

What requirements in AS13100 Chapter A apply to my organization?

Determine what type of organization you are in

Agree the type with your customer

Identify your applicable requirements in Table 1

Deploy

Identify your organization type

Guidance in AS13100 Appendix B

Table 2

<table>
<thead>
<tr>
<th>Type 1: Make to Print</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes ➔</td>
</tr>
</tbody>
</table>

Note: This includes suppliers that purchase parts from third parties manufactured against Customer proprietary drawings and don’t add any additional value themselves.

<table>
<thead>
<tr>
<th>Type 2a: Design/Make</th>
</tr>
</thead>
<tbody>
<tr>
<td>No ➔</td>
</tr>
</tbody>
</table>

Do you manufacture or assemble at least one part defined by the Customer (e.g., customer-proprietary design, customer-directed 3rd party design), including castings and forgings?

Do you only manufacture or assemble finished part(s) produced against drawings, etc., proprietary to your company?
**AS13100 Requirement Highlights**

**Identify your organization type – cont.**

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes →</th>
<th>No ↓</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you provide parts (raw materials, Industry Standard Parts, and Commercial-Off-The-Shelf (COTS) parts that are procured from other sources and not transformed, assembled, or otherwise modified by your company?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do you only produce raw materials used in Customer’s products and called out at the lowest level of the design authority’s Bill of Material (BOM) (e.g., bar, billet, sheet, tube, plate, powder)?</td>
<td>Yes →</td>
<td>No ↓</td>
</tr>
<tr>
<td>Do you provide design elements (i.e., results of design work activities) into a Design Technical Data Package (DTDP) or for other design decisions?</td>
<td>Yes →</td>
<td>No ↓</td>
</tr>
<tr>
<td>Do you only provide Special Process services?</td>
<td>Yes →</td>
<td>No ↓</td>
</tr>
<tr>
<td>Do you only provide shop assist services in support of customer’s manufacturing operations?</td>
<td>Yes →</td>
<td>No ↓</td>
</tr>
<tr>
<td>Do you provide services not listed above or in addition to the above?</td>
<td>Yes →</td>
<td>Contact your Customer</td>
</tr>
</tbody>
</table>

**Ensure that you agree the type with your customer**

- **Type 2b: Design**
- **Type 3: Distributor**
- **Type 4: Special process**
- **Type 5: Raw material**
- **Shop assist**
- **Contact your Customer**
### AS13100 Requirement Highlights

**Identify your applicable AS13100 Chapter A paragraphs in Table 1**

**Deploy the requirements**

Table 1 provides a guide to the applicability of AS13100 Sections to Organization scope.

<table>
<thead>
<tr>
<th>AS13100 Paragraph Reference</th>
<th>Type 1: Make to Print</th>
<th>Type 2A: Design and Manufacture</th>
<th>Type 2B: Design Only</th>
<th>Type 3: Distributor</th>
<th>Type 4: Special Process</th>
<th>Type 5: Raw Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.3.1</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>4.3.2</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>4.3.3</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>4.3.4</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>4.3.5</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>4.4.3</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>5.1.1.1</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>5.2.1.1</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>5.3.1</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>6.1.3</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>7.1.3.1</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>7.1.5.1.1</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>7.1.5.1.2</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>7.1.5.1.3</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>
Which organization type best describes your organization?

Start presenting to display the poll results on this slide.
AS13100 Benefits

1. Single AESQ Standard aligned to AS9100 / ISO9001
   - Less Requirements for the Supplier (>50% less)
   - Lower cost (suppliers do not need to buy multiple standards)

2. Supported by Free Issue Reference Manual Guides

3. Will minimise the content of OEM Supplier Requirement Standards (SABRe, S-1000, ASQR-01 and SAFe)

4. Creates a common language for Quality, OEMs have adopted standard approaches within their own operations.

5. Aligns to relevant existing industry standards (ISO, AS9xxx, Nadcap, etc)

6. Supported by global approved training resources

7. Enables the AESQ OEMs to provide a harmonised approach to Supplier Development

8. Supplier Compliance continues to be assessed through Customer Audit

9. Allows AESQ to focus on Supply Chain Capability Development
AS13100 Requirement Highlights

The current AS13xxx series of standards have been integrated into AS13100:
- AS13000 Problem Solving using 8D
- AS13002 Alternative Inspection Plans
- AS13003 MSA
- AS13004 Process FMEA and Control Plans
- AS13006 Process Control

Free issue Reference Material is available to support the deployment of AS13100.

AS13001 DPRV Training will remain unchanged.

AS13100 organizes its additional requirements aligned to AS9100 and AS9145 standard structures.

It also includes requirements to other AS series standards including:
- AS9102 First Article Inspection
- AS91146 FOD
- AS9115 Deliverable Software
- AS9116 Design Change Process
- AS9117 DPRV
- AS5553 Counterfeit Parts (EEE)
- AS6174 Counterfeit Parts

Recognizes NADCAP certification for special processes for both internal and external operations.

(Section 4.3.3)
AS13100 Requirement Highlights

Organization's are required to include **Human Factors** within the scope of their QMS (Section 4.4.3, 5.1.1.1, 5.2.1.1 and 7.3.1)

An agreed set of **Certification Requirements**, matched to the scope of the supplier’s activities is defined (Section 4.3.3)

The organization shall conduct a **Compliance Assessment** of their QMS to ensure that it captures all of the requirements of AS13100. Any gaps must be agreed with the individual customer. (Section 4.3.5)
AS13100 Requirement Highlights

AS13100 requires four Audit Types to be conducted:
1) Quality Management System Audits
2) Production Process Audits
3) Product Audits
4) Special Process Audits

Organizations are required to provide On the Job Training that includes customer requirements, regulatory requirements, etc.

Quality Leaders are required to attend the AESQ Quality Foundation Training Class. Also recommended for other key personnel.

Auditor Competence Requirements defined for:
- Qualifications
- Education
- Experience
- Ongoing professional development

Organizations are required to produce an Annual Audit Report to summarize performance for Customer Review.

(Section 7.2.2)

(Section 7.2.4)
AS13100 Requirement Highlights

**Common Record Retention policy for OEMs**
(Section 7.5.3.5)

**Requirements for Design & Development** defined including the use of DFMEA for Design Risk Analysis
(Section 8.3)

**Compliance to AS9146 FOD Prevention** is required in Design Requirements (8.3.3.3), Production Control (8.5.4.1) and Supplier Control (8.4.2.1)

**AS13100 defines the requirements for Supplier Evaluation, Selection, Control and Performance Monitoring.**
(Section 8.4.1)
AS13100 Requirement Highlights

Specifies the use of **AS5553** Counterfeit Electrical, Electronic and Electromechanical Parts and **AS6174** for Counterfeit Material (Section 8.1.4.1 & 8.4.2.1)

The organization shall verify that the correct metallic raw material is used e.g. through the use of **hand held spectrometry**. (Section 8.5.1.4.1)

The organization shall ensure that it uses the customer created scorecard to prioritize improvement actions.

The organization must strive for **100% Quality, & Delivery performance**. (Section 9.1.2.1)

Defines the use of **8D Problem Solving** for key issues.

Additional guidance on Problem Solving when 8D’s are not required to be included in the Reference Manual RM13000. (Section 10.2.3)
AS13100 Requirement Highlights: Chapter B APQP & PPAP

AS9145 APQP & PPAP required to manage:
- New Product Introduction
- Product & Design Changes
- Source Changes

Additional Quality Tools identified that are not in AS9145 APQP / PPAP
1. Pre-launch Control Plan
2. Supply Chain Risk Management Process

Additional Quality Tools identified that are not in AS9145 PPAP
1. DFMEA defined as the Design Risk Analysis tool
2. Defines AESQ Guidance Documents for PPAP elements
3. Initial manufacturing Performance Studies
4. Dimensional / non-Dimensional Results

Defines Submission Requirements for PPAP based on Supplier Performance;
1. Submit Warrant only to customer, Retain evidence at Supplier
2. Submit PPAP evidence to customer and Retain all documents
3. Witness at Supplier
AS13100 Supporting Reference Manuals

AS13100 Standard defines mandated requirements. The Standard is supported by free issue Reference Manuals from the AESQ Website:

→ https://aesq.sae-itc.com/content/aesq-documents

Reference Manuals provide industry best practice guidance and case study material on how to deploy quality tools effectively. Reference Manuals are maintained and updated by the AESQ Subject Matter Interest Groups and may be updated at any time when new or revised information becomes available.
AESQ is Seeking Feedback on AS13100

- Clarifications
- Grammar & Spelling
- Suggested Improvements
- Other?

Email: info@aesq.sae-itec.org
Where are we?

March 2021
AS13100 Publication

Deployment Started

Target: December 31, 2022
- Transition Completed

Ongoing compliance activities 2023

GE Aerospace

Honeywell Aerospace

MTU Aero Engines

Precision Castparts Corp.

Safran Aircraft Engines

Rolls-Royce

IHI

GKN Aerospace

AESQ – Aerospace Engine Supplier Quality Strategy Group

This document slide does not contain ITAR or EAR technical data. The content of this presentation slide is proprietary and confidential information of the AESQ. It is not permitted to be distributed to any third party without the written consent of the AESQ.
Implementation Resources

**AESQ Subject Matter Interest Groups**

<table>
<thead>
<tr>
<th>Advanced Product Quality Planning (APQP) &amp; Production Part Approval Process (PPAP)</th>
<th>Defect Prevention Tools to Support APQP &amp; PPAP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design Work &amp; Production Repair &amp; Rework</td>
<td>Measurement Systems Analysis (MSA)</td>
</tr>
<tr>
<td>Sub Tier Management</td>
<td>Process Control Methods</td>
</tr>
<tr>
<td>Human Factors</td>
<td>Problem Solving Methods</td>
</tr>
<tr>
<td>DPRV Training</td>
<td>Quality Audit Methods</td>
</tr>
<tr>
<td>First Article Inspection</td>
<td></td>
</tr>
</tbody>
</table>

**Reference Manual**

<table>
<thead>
<tr>
<th>RM13006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem Solving Methods including BD</td>
</tr>
<tr>
<td>• BD Interactive Tool (PowerPoint)</td>
</tr>
<tr>
<td>• BD Reporting Template (PowerPoint)</td>
</tr>
<tr>
<td>• BD Word Format (Word)</td>
</tr>
<tr>
<td>• BD Template (Excel)</td>
</tr>
<tr>
<td>• BD Template (PowerPoint)</td>
</tr>
</tbody>
</table>

**AESQ™ Defect Prevention Tools to Support APQP & PPAP Subject Matter Interest Group**

**AESQ Process Control Methods (RM13006) Community of Practice**
AESQ Supplemental Materials Downloaded

<table>
<thead>
<tr>
<th>Year</th>
<th>Downloads</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020</td>
<td>1,710</td>
</tr>
<tr>
<td>2021</td>
<td>18,252</td>
</tr>
<tr>
<td>2022</td>
<td>38,244</td>
</tr>
<tr>
<td>Jan 2023</td>
<td>3,534</td>
</tr>
</tbody>
</table>
### AESQ Event Engagement

#### # Registered + # Video Views

**2022**

- **Webinar: Process Capability for Unilateral Tolerances including True Position**
  - Registered: 800
  - Video Views: 253

- **Webinar: What Makes a Good Process Capability Study?**
  - Registered: 381
  - Video Views: 253

- **Supplier Forum: Marsy (OCT 21)**
  - Registered: 105
  - Video Views: 411

- **Supplier Forum: Indianapolis (OCT 6)**
  - Registered: 145
  - Video Views: 411

- **Webinar: APQP & PPAP #2 (SEP 29)**
  - Registered: 200
  - Video Views: 489

- **Webinar: APQP & PPAP #1 (SEP 28)**
  - Registered: 387
  - Video Views: 489

- **Webinar: DFMEA - Part 2 of 2 (JUN 23)**
  - Registered: 232
  - Video Views: 489

- **Webinar: DFMEA - Part 1 of 2 (JUN 22)**
  - Registered: 232
  - Video Views: 489

  - Registered: 368
  - Video Views: 421

- **Supplier Forum: Europe & Americas (MAY 4)**
  - Registered: 306
  - Video Views: 477

- **Supplier Forum: Asia & Europe (APR 28)**
  - Registered: 294
  - Video Views: 279

- **Webinar: RML3000 Problem Solving Supplier Feedback (APR 20)**
  - Registered: 87
  - Video Views: 279

- **Webinar: FAAI (APR 13)**
  - Registered: 309
  - Video Views: 279

**2023**

- **Webinar: Human Factors (JAN 12)**
  - Registered: 389
  - Video Views: 799

- **Webinar: Human Factors (NOV 30)**
  - Registered: 64
  - Video Views: 388

- **Supplier Forum: AS13100 Q&A Session (OCT 26)**
  - Registered: 172
  - Video Views: 661

- **Supplier Forum: AS13100 Deployment (OCT 6)**
  - Registered: 525
  - Video Views: 427

- **Webinar: PFMEA & Control Plans - Part 3 of 3 (SEP 16)**
  - Registered: 778
  - Video Views: 918

- **Webinar: PFMEA & Control Plans - Part 2 of 3 (SEP 15)**
  - Registered: 778
  - Video Views: 1,044

- **Webinar: PFMEA & Control Plans - Part 1 of 3 (SEP 14)**
  - Registered: 778
  - Video Views: 2,263

- **Webinar: "Move with SAP - Mobility" - AS13100 Focus (MAY 20)**
  - Registered: 610
  - Video Views: 329

- **Supplier Forum: AS13100 Publication (APR 21)**
  - Registered: 1,645
  - Video Views: 1,421

**Average**

- Registration – 381
- Attendance – 258
- Video Views – 489
AESQ Deployment Survey Overview

August 2021: First survey of suppliers on the general knowledge of AS13100 and the AESQ
- 158 respondents
- Familiar with AESQ for existing AS13000 series documents

April 2022: Follow up survey targeted to better understand the aero-engine supply base’s AS13100 implementation status
- 482 respondents
- 608 comments and suggestions analyzed

September 2022: Survey targeted to develop plans to help suppliers for Q4
- Same questions from April to build trend and collect feedback on deployment
- 255 respondents

February 2023: Post deployment survey to find opportunities
- Continue with similar questions to track evolution
- 251 respondents
Who Responded?

Respondents had an average of 3.75 AESQ customers
Familiarity with the AS13100 standard

- 100%
- 90%
- 80%
- 70%
- 60%
- 50%
- 40%
- 30%
- 20%
- 10%
- 0%

- **Sep 2021**
  - I have read the AS13100 Standard and some or all of it’s Reference Manuals
  - I have read the entire AS13100 Standard
  - I have read some sections from the AS13100 Standard
  - I have reviewed the AS13100 Table of Contents only
  - My organization does not yet have a copy of AS13100

- **Apr 2022**

- **Sep 2022**

- **Feb 2023**

This document slide does not contain ITAR or EAR technical data. The content of this presentation slide is proprietary and confidential information of the AESQ. It is not permitted to be distributed to any third party without the written consent of the AESQ.
The organization believes we are now compliant with AS13100

The RM13009 gap analysis has been completed and a gap closure action plan is in place

The compliance gap analysis of RM13009 has been initiated and is in process

We have purchased a copy of AS13100 and are reviewing it

Compliance activities have not yet begun
Q5 What level of confidence do you have that your company is/will be fully compliant to AS13100?

Answered: 251   Skipped: 0

- **High**: 50.20%
- **Medium**: 40.64%
- **Low (Please indicate are...)**: 9.16%
Q2 How many individuals at your company have completed the AS13100 Requirement Training?

- Requirements training is the online training
- Expectations that it is required to conduct effective gap analysis
- We have set a minimal of 1 per company, but expect more for effective deployment
Biggest Challenges

Q6 What is the biggest challenge to your company being able to comply with AS13100? (check all that apply)

Answered: 251    Skipped: 0

- Human Factors: 45.42%
- APQP/AS9145: 55.38%
- Design FMEA: 11.55%
- Control Plans: 15.94%
- Inspection: 5.58%
- Process Control: 19.52%
- AS13100 Training: 25.90%
- Sub-Tier Management: 33.47%
- Other - please specify below: 20.72%
Q7 Have you participated in any of the following AESQ events or activities? (select all that apply)

Answered: 251  Skipped: 0

- AESQ Supplier Forums: 41.83%
- AESQ Topic Specific Webinars (ex. Human Factors): 39.44%
- AESQ Communities of Practice on LinkedIn: 13.15%
- AESQ Member Company Event: 9.16%
- Other? Please specify below: 5.18%
- We have not participated in any: 37.05%
How can the AESQ further support you in effective deployment?
Break Time
Return in 20 Minutes
Using FMEA to Reduce Human Error in Assembly & Test

Tracey Lockhart
Head of Quality, Manufacturing Engineering and Continuous Improvement
Our Product Portfolio

Civil Large

Trent XWB-84  Trent XWB-97  Trent 1000-TEN  Trent 7000

Defense
What is your knowledge of Human Factors?
What is your knowledge of FMEA?
30,000 Components

6,000 Manual Operations

Human Factors play a critical part in assuring Product Quality
RR Deployment Framework

Human Factors

The Dirty Dozen

1. Lack of Communication
2. Complacency
3. Lack of Knowledge
4. Distraction
5. Lack of Team Work
6. Fatigue
7. Lack of Resources
8. Pressure
9. Lack of Assertiveness
10. Stress
11. Lack of Awareness
12. Norms
Human Factors

Using the FMEA Approach

The Dirty Dozen

(Simplified FMEA template for illustration purposes only. Some columns are missing e.g. the scoring is not included)
Human Factors FMEA

Let’s have a go!
Scenario – Final Inspection, Friday 2.30 p.m.

• Engine due for delivery at 5 p.m. Truck waiting outside. Pickup scheduled for 11 p.m.

• The Prince of Wales is due to visit at 3 p.m. and have a picture taken in Final Inspection next to this finished Engine

• Two of the inspection team who should be working on the engine have phoned in sick this morning

• The final paperwork usually takes 3 hours to compile once the engine is finished. The delays mean that the team will only have 2 hours to get it all done.

• Senior Logistics Manager is in the area to get constant updates on progress to ensure the engine will be ready to deliver on time

• The Senior Communications Manager is also in the area to ensure that everything is ready for the royal visit
Which of these Dirty Dozen applies to this Scenario?
The information in this document is proprietary and confidential to Rolls-Royce and is available to authorised recipients only – copying and onward distribution is prohibited other than for the purpose for which it was made available. Rolls-Royce content only.

### Human Factors FMEA

<table>
<thead>
<tr>
<th>Area</th>
<th>Complacency</th>
<th>Distractions</th>
<th>Fatigue</th>
<th>Assertiveness</th>
<th>Awareness</th>
<th>Communication</th>
<th>Knowledge</th>
<th>Resources</th>
<th>Teamwork</th>
<th>Pressure</th>
<th>Stress</th>
<th>Unhealthy Norms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturing</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
<td>12</td>
</tr>
<tr>
<td>Certification Office</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
<td>12</td>
</tr>
<tr>
<td>Customer Delivery Centre</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
<td>12</td>
</tr>
<tr>
<td>Engine Test</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
<td>12</td>
</tr>
<tr>
<td>Engine Build</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
<td>12</td>
</tr>
</tbody>
</table>

Each area will have its own, unique human factor risk profile however some risks will be similar across multiple areas.
Human Factors FMEA - Improvement Examples

- Lack of Awareness
- Lack of Communication
- Distractions
- Behavioral Nudges
- Lack of Teamwork / Pressure
- New Electronic Shift Handover System (MS Power Apps)
- Team Building Away Days
- Enhanced Compliance Checking

Toolbox Talks

Lack of Communication

New Electronic Shift Handover System (MS Power Apps)

Enhanced Compliance Checking

The information in this document is proprietary and confidential to Rolls-Royce and is available to authorised recipients only – copying and onward distribution is prohibited other than for the purpose for which it was made available. Rolls-Royce content only.
Key Insights

- In a Manual Assembly Environment Human Factors can have a significant impact on business performance
- The structured approach of FMEA has proven to be an important tool to identify Human Factor Issues to drive preventive action
- We have learned that;
  
a) Including Human Factor risks into the Product PFMEA creates too much ‘noise’ – hence a separate Human Factor FMEA approach is used
  
b) A reference style Human Factor FMEA approach can be used for high level analysis but each area will have a unique ‘signature’
  
c) It is an easy concept for the teams to use
  
d) It necessitates the engagement with the wider workforce to validate the findings
  
e) Creates cross functional / high value discussions that lead to better insights
  
f) It drives improvements based on risk
  
g) Improved awareness and issue reporting where deployed (>200% increase)
BREAKOUT SESSION #1
SUBJECT MATTER INTEREST GROUPS

BARRIE HICKLIN
SR. DIRECTOR, QUALITY SYSTEMS & REGULATORY COMPLIANCE
HONEYWELL
# Breakout Session #1: Subject Matter Interest Groups

90 Minutes (15 minutes per session)

<table>
<thead>
<tr>
<th>Table</th>
<th>Title</th>
<th>Leader</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Quality Audit (RM13005) Compliance Assessment (RM13009)</td>
<td>Jim Wilson, Pratt &amp; Whitney</td>
</tr>
<tr>
<td>2</td>
<td>Human Factors (RM13010)</td>
<td>Richard Bolingbroke, Timet</td>
</tr>
<tr>
<td>3</td>
<td>APQP &amp; PPAP (RM13145)</td>
<td>Ken Hatcher, Raytheon Technologies</td>
</tr>
<tr>
<td>4</td>
<td>PFMEA Defect Prevention (RM13004)</td>
<td>Jim Barge, GE, and Lisa Rioux, Pratt &amp; Whitney</td>
</tr>
<tr>
<td>5</td>
<td>Process Control (RM13006)</td>
<td>Ricardo Banuelas, Rolls-Royce</td>
</tr>
<tr>
<td>6</td>
<td>Training (AS13100 &amp; AS13001 DPRV)</td>
<td>Earl Capozzi, Pratt &amp; Whitney and Shari Pobjecky, SAE</td>
</tr>
<tr>
<td>7</td>
<td>Sub Tier Management (RM13007)</td>
<td>Larry Bennett, GE Aerospace</td>
</tr>
</tbody>
</table>
Breakout Session #1 – Subject Matter Interest Groups
90 Minutes Total (15-Minute Sessions)

Front Desk

RM13006 Process Control
RM13004 PFMEA Defect Prevention
RM13145 APQP/PPAP
RM13010 Human Factors
RM13007 SubTier Management
Training

RM13009 Compliance
RM13005 Quality Audit

Doors
Return in 60 Minutes
AESQ AS13100 TRAINING OVERVIEW

EARL CAPOZZI
DISCIPLINE CHIEF; QUALITY & PROCESS
ENGINEERING / SUPPLIER QUALITY
PRATT WHITNEY
Training Program Goals

- Support deployment and adoption of AS13100
- Knowledge to design, maintain & assess business processes to meet intent of standard
- Focus on key concepts, impact to compliance and customer requirements and benefits to business performance
- Simplify and clarify the requirements with a standardized training approach
### AESQ Approved AS13100 Trainings

<table>
<thead>
<tr>
<th>Delegated Product Release Verification (DPRV)</th>
<th>AESQ Approved AS13100 Requirements Course</th>
<th>AESQ Quality Foundations Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>DPRV personnel <strong>shall</strong> be trained and certified in accordance with AS13001 Delegated Product Release Verification Training Requirements (7.2.3)</td>
<td>The organization <strong>shall</strong> ensure that Quality Leaders with responsibility for deploying the requirements of AS13100 within the organization are trained in the requirements of AS13100 and related Quality Mgmt. Standards. <strong>Recommended</strong> for functional leaders responsible for creating or managing processes that are impacted by AS13100 Requirements (7.2.4)</td>
<td>The organization’s Quality Leaders with responsibility for supporting the design, manufacturing, and assembly operations via AS13100 <strong>shall</strong> undergo training in the AESQ Quality Foundations course. <strong>Recommended</strong> for design engineering, manufacturing engineering and operations roles. (7.2.4)</td>
</tr>
<tr>
<td><strong>Required</strong> for DPRV certification and recertification since 2015</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
LEVEL ONE

AS13100 Executive Overview

Five-Part Video Series, 35 minutes
- Executive perspectives from across the industry detailing why compliance to AS13100 is critical to your company’s success
- Training FAQs address who should enroll in AESQ trainings.

No Charge

LEVEL TWO

AS13100 Requirements

On-demand virtual course, 10 hours
- Guides the user through each section of the AS13100 standard, providing knowledge that supports the requirements and business processes to meet the intent of the standard
- Recommended for functional leaders responsible for creating or managing processes that are impacted by AS13100

$399

LEVEL THREE

AS13100 Quality Foundations

Virtual or In Person, 3-Days
- Live instructors provide an overview of the AS13100 Standard, and a detailed exploration of the guidance provided in the Reference Manuals
- Recommended for design engineering, manufacturing engineering and operations roles

$1095
**SAE AS13100 Quality Requirements Course Overview**

- **Required** for Quality Leaders with responsibility for deploying the requirements of AS13100

- **Recommended** for functional leaders responsible for creating or managing processes that are impacted by AS13100

- Provides knowledge and insight for each of the AESQ supplemental requirements

- Provides knowledge that helps the learner assess, design, maintain and comply with the business processes, which keep you compliant and adds value to the business
SAE AS13100 Quality Foundations Course Overview

- **Required** for Quality Leaders with responsibility for supporting the design, manufacturing, and assembly operations via AS13100.

- Quality Leaders who have completed a recognized OEM training course are exempt from the SAE course.

- **Recommended** for anyone with accountability for the quality of the design, production, assembly and test areas of the organization.

- Joins key quality systems, processes and methodologies to show how they work systemically to focus on Defect Prevention. Provides deeper insight into each of the AESQ supplemental Reference Manuals.
AS13100 Requirements Course Participation 2022

1,144 Completed
1,856 Registered
458 Suppliers
32 Countries

JAN 25
FEB 49
MAR 62
APR 67
MAY 71
JUN 110
JUL 88
AUG 100
SEP 90
OCT 122
NOV 150
DEC 210

AESQ – Aerospace Engine Supplier Quality Strategy Group

This document slide does not contain ITAR or EAR technical data. The content of this presentation slide is proprietary and confidential information of the AESQ. It is not permitted to be distributed to any third party without the written consent of the AESQ.
AS13100 Requirements Course Completions 2023

- 315 Completed
- 275 Registered
- 33 Suppliers
- 22 Countries

<table>
<thead>
<tr>
<th>Month</th>
<th>Completed</th>
<th>Registered</th>
<th>Suppliers</th>
<th>Countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>JAN</td>
<td>150</td>
<td>275</td>
<td>33</td>
<td>22</td>
</tr>
<tr>
<td>FEB</td>
<td>94</td>
<td>275</td>
<td>33</td>
<td>22</td>
</tr>
<tr>
<td>MAR</td>
<td>71</td>
<td>275</td>
<td>33</td>
<td>22</td>
</tr>
</tbody>
</table>
Quality Foundations Course Participation 2022

877 Completed
1,066 Registered
428 Suppliers
32 Countries
Quality Foundations Course Completions 2023

- JAN: 142
- FEB: 85
- MAR: 88

315 Completed
258 Registered
8 Suppliers
12 Countries
Does Your QMS Meet AS13100 Requirements?

Trainings are available in multiple formats and can also be delivered privately to your organization.

https://aesq.sae-itc.com/training
https://discover.sae.org/AS13100

Developed in partnership with the AESQ and the G-22 writing committee SMEs
BREAKOUT SESSION #2
ZERO DEFECTS FOR EVERYONE

LISA CLAVELOUX
SR. DIRECTOR, QUALITY
RAYTHEON TECHNOLOGIES
PRATT & WHITNEY DIVISION
Zero Defects Principles

a) Quality is defined as conformance to customer requirements

b) The quality standard (target) is Zero Defects

c) Defect prevention not Inspection to ensure Quality

d) Quality is measured through the Cost of non-quality
Getting to Zero Defects…

Chris Customer

Petra Purchase

Mel ME

Den Designer

Leslie Logistics

Quincy Quality

Fran Finance

Izzy Inspector

Olly Operator

Hillary HR

Arrange these characters into a natural value stream and identify what they need to provide to each other to achieve zero defects
Quality Improvement vs Zero Defects

**Zero Defects Thinking**
- What do we want to happen
- What could go wrong
- Eliminate / reduce the likelihood of it going wrong
- Manage the process and use feedback to ensure it continues to give us the right outcome

**Traditional Improvement**
- Wait for something to happen
- See why it happened
- Try and remove the cause so it can’t happen again
Getting to Zero Defects...

Overlay the Zero Defects tools and practices over the value stream
The Quality Value Stream

**DFMEA**
Identifies the aspects of the product that are important to meeting customer requirements, to prioritise improvements.

**PFMEA**
Identifies the aspects of the production process that are important to meeting product requirements, to prioritise improvements.

**CONTROL PLAN**
Specifies variables in the manufacturing process that need to be controlled to guarantee that the design features produced are conforming.

**MSA**
Ensures that the inspection systems are fit for purpose and capable of measuring the design features.

**PACKAGING STANDARDS**
Ensures that the product is fully protected during transportation and storage.

**CUSTOMER SPECIFICATION**
Clearly defines what the customer wants, embedded in the purchase order. Sets the expectation of what the product or service must do to satisfy their requirements.

**CUSTOMER**
Sees the expectation of what the product or service must do to satisfy their requirements.

**CUSTOMER SPECIFICATION**
Clearly defines what the customer wants, embedded in the purchase order.

**SABRe**
"Supplier Management System Requirements" is the supplier-facing mirror of the RRM and is applicable to all suppliers or partners.

**TRAINING PLANS**
Ensure that everyone is capable of doing the jobs they are required to do.

**COQ**
The total cost of not achieving Zero Defects, scrap, concessions, inventory, productivity, customer dissatisfaction.

**SQA**
“Supplier Management System Requirements” is the supplier-facing mirror of the RRM and is applicable to all suppliers or partners.

**Audit**
Regular checks to ensure that all relevant procedures in the RRM are being complied to.

**CUSTOMER**
Sees the expectation of what the product or service must do to satisfy their requirements.

This document slide does not contain ITAR or EAR technical data. The content of this presentation slide is proprietary and confidential information of the AESQ. It is not permitted to be distributed to any third party without the written consent of the AESQ.
Break Time
Return in 25 Minutes
AS13100 FAQ PANEL SESSION

Barrie Hicklin
Honeywell

Larry Bennett
GE Aerospace

Earl Capozzi
Pratt & Whitney

Denis Pottier
Safran Aircraft Engines

Ricardo Banuelas
Rolls-Royce
VOICE OF THE CUSTOMER

AMY GOWDER
PRESIDENT & CEO
DEFENSE AND SYSTEMS
GE AEROSPACE
AESQ

HOW TO GET INVOLVED

JUN SAKAI
CHIEF ENGINEER
IHI
“Get Involved” with AESQ

• Go to AESQ Homepage
  https://aesq.sae-itc.com/

• Click “Get Involved”
“Get Involved” Options

1. Subscribe to AESQ’s Newsletter

2. Become an AESQ Member

3. Join the SAE G-22 Standards Committee

4. Join an AESQ Community of Practice on LinkedIn

Click on the appropriate link for additional information
“Get Involved” – Subscribe to Receive AESQ’s Newsletter

- Issued monthly
- Learn about AESQ’s current activities
- Complete online form to begin receiving

Aerospace Engine Supplier Quality Strategy Group

This document slide does not contain ITAR or EAR technical data. The content of this presentation slide is proprietary and confidential information of the AESQ. It is not permitted to be distributed to any third party without the written consent of the AESQ.
“Get Involved” – Become an AESQ Member

2 Membership Levels:

AESQ Strategy Group Member – specified in the AESQ Charter due to their critical support resulting in the establishment of the AESQ Strategy Group.

AESQ Member –
- Open to organizations engaged in the Aero Engine supply chain.
- Opportunity to participate in the work of AESQ by providing resources to support AESQ working groups and Subject Matter Interest Groups (SMIGs).
- Representatives shall be senior leaders from the organization or subject matter experts in a relevant area.

Complete Membership Application at bottom of page
“Get Involved” – Join a Community of Practice

LinkedIn Groups for each Community of Practice are open for anyone to join

<table>
<thead>
<tr>
<th>Communities of Practice</th>
<th>Members</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem Solving Methods</td>
<td>301</td>
</tr>
<tr>
<td>First Article Inspection (FAI)</td>
<td>278</td>
</tr>
<tr>
<td>Defect Prevention Tools</td>
<td>421</td>
</tr>
<tr>
<td>Design Work &amp; Production Repair</td>
<td>142</td>
</tr>
<tr>
<td>Quality Audit Methods</td>
<td>277</td>
</tr>
<tr>
<td>Sub-Tier Management</td>
<td>189</td>
</tr>
<tr>
<td>Measurement Systems Analysis (MSA)</td>
<td>230</td>
</tr>
<tr>
<td>Human Factors</td>
<td>172</td>
</tr>
<tr>
<td>DPRV</td>
<td>214</td>
</tr>
<tr>
<td>APQP &amp; PPAP</td>
<td>404</td>
</tr>
<tr>
<td>Process Control Methods</td>
<td>157</td>
</tr>
<tr>
<td>Compliance Assessment</td>
<td>21</td>
</tr>
<tr>
<td>Alternate Inspection Frequency</td>
<td>30</td>
</tr>
</tbody>
</table>

The AESQ encourages subject matter experts to engage with this Community of Practice to positively promote the use of Reference Manual RM13010 to support deployment of Human Factors in line with the SAE AS5100 Standard.

The AESQ are planning a Webinar on APQP/PPAP. Polling suggests the topic is APQP Planning & Review. Which aspect will benefit your company?
“Get Involved” – Additional Options

- Attend AESQ Events (Supplier Forums, Webinars) or Watch Videos Online
- Take a AS13100 Training Course
- Download AESQ Reference Manuals (RMs) & Templates
- Watch the “Zero Defects” Video
SUMMARY & CLOSE

BARBARA NEGROE
EXECUTIVE SOURCING QUALITY LEADER
GE AVIATION
WHAT DOES SUCCESS LOOK LIKE?

Leaders advocating for process control - speaking the language
Common tool usage, processes control is the way we work
Developing proficiency through common Industry training
Culture of product safety and quality felt into the tiers of the supply base
Continuous Improvement of the AS13100 standard - feedback from supply base, OEM’s, customers

Mindset shift - Belief that zero defects is achievable
AESQ Thanks You for Attending!