Welcome & Introductions

90+ Individuals Registered from 15 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 practice
- Provide feedback to the AESQ
- Develop a network of practitioners and Subject Matter Experts
2022 AESQ Supplier Forums: Focus on AS13100 Deployment

Introducing AS13100: AESQ Quality Management Requirements

THE NEW STANDARD CREATING A COMMON LANGUAGE FOR QUALITY THROUGHOUT THE AEROSPACE ENGINE SUPPLY CHAIN

SAE AS13100 AESQ QUALITY MANAGEMENT SYSTEM REQUIREMENTS FOR AERO ENGINE DESIGN AND PRODUCTION ORGANIZATIONS

This standard sets out to create a common set of supplemental requirements with common terms and reference manuals to improve understanding, efficiency, and performance. While significantly simplifying the business of suppliers with multiple customers, the primary intent of this new standard is to discover specific product quality issues around in the supply chain and across the contractual arrangements among suppliers.

These common supplemental requirements are designed to raise the bar for expected performance in these key areas, and therefore demand more is provided to ensure clarity of expectations.

To ensure customer satisfaction, the aviation, space, and defense industry requires a way to produce and deliver quality products with quality assurance levels that meet the expectations of this industry and the resulting diversity of regulations, standards, and specifications have complicated the requirements. This product organization faces the challenge of ensuring the quality and integration of systems that are sourced from across the world and at all levels within the supply chain. Industry leaders face the challenge of delivering products that meet customer needs without compromising quality expectations and requirements.

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

AESQ – Aerospace Engine Supplier Quality Strategy Group

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| Agenda |
|---|---|
| **Topic** | **Presenter** |
| Welcome & Introductions | Barbara Negroe, Executive Sourcing Quality Leader, GE Aviation |
| Safran Welcome Address | Benedicte Bonnet, Vice President, Quality Improvement and Digital Transformation, Safran Aircraft Engines |
| AESQ Overview, Vision & Objectives | Lisa Claveloux, Sr. Director Group Quality, Pratt & Whitney |
| AS13100 Standard Overview | Earl Capozzi, Associate Director, Discipline Chief, Quality & Process Engineering/Supplier Quality, Pratt & Whitney |
| Deployment & Transition to AS13100 | Catherine Catarina-Graca, Supplier Management System Coordinator, Safran Aircraft Engines |
| Deployment Milestones  
• Introduction & Milestones  
• Deployment Survey Results  
• APQP Deployment  
• Implementation Status Reporting in 2023 | Helen Djaknegren, Director Supplier Quality & Development, GKN Aerospace  
Karl Evans, APQP Technical Project Manager, Rolls-Royce |

BREAK – 20 Minutes
## Agenda

<table>
<thead>
<tr>
<th>Topic</th>
<th>Presenter</th>
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</thead>
<tbody>
<tr>
<td>AS13100 Implementation Plans + RM13009 Gap Analysis Case Studies</td>
<td>Soraya Barj, Quality &amp; Airworthiness Manager, Parker Meggitt&lt;br&gt;Thomas Duelberg, Business Unit Quality System Manager, Leistritz Turbinentechnik GmbH&lt;br&gt;Turgut Çicek, Quality &amp; Manufacturing Engineering Director, Tusas Engine Industries (TEI)</td>
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<tr>
<td>Training Overview</td>
<td>Earl Capozzi, Associate Director, Discipline Chief, Quality &amp; Process Engineering/Supplier Quality, Pratt &amp; Whitney</td>
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<tr>
<td><strong>GROUP PHOTO &amp; LUNCH – 75 MINUTES</strong></td>
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<tr>
<td>OEM Requirements Session</td>
<td>Ian Riggs, Quality &amp; HSE Executive, Customer, Assembly &amp; Test, Rolls-Royce&lt;br&gt;Gokhan Kulali, Supplier Quality Engineer, GE Aviation&lt;br&gt;Denis Pottier, Head of the Purchasing Quality Assurance Department, Safran Aircraft Engines&lt;br&gt;Catherine Catarina-Graca, Supplier Management System Coordinator, Safran Aircraft Engines&lt;br&gt;Earl Capozzi, Associate Director, Discipline Chief, Quality &amp; Process Engineering/Supplier Quality, Pratt &amp; Whitney</td>
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Agenda

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<td>AS13100 FAQ Panel</td>
<td>MODERATOR: Barrie Hicklin, Sr. Director, Quality Systems &amp; Regulatory Compliance, Honeywell Aerospace</td>
</tr>
</tbody>
</table>
|                         | PANELISTS: 
|                         | Ian Riggs, Quality & HSE Executive, Customer, Assembly & Test, Rolls-Royce |
|                         | Catherine Catarina-Graca, Supplier Management System Coordinator, Safran Aircraft Engines |
|                         | Earl Capozzi, Associate Director, Discipline Chief, Quality & Process Engineering/Supplier Quality, Pratt & Whitney |
|                         | Karl Evans, APQP Technical Project Manager, Rolls-Royce                   |
| BREAK – 20 Minutes      |                                                                           |
| Zero Defects Journey    | Barrie Hicklin, Sr. Director, Quality Systems & Regulatory Compliance, Honeywell |
| AESQ How to Get Involved| Markus Braig, Director Quality Supply Chain and MRO, MTU Aero Engines     |
| Summary & Close         | Barbara Negroe, Executive Sourcing Quality Leader, GE Aviation            |
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)
What city do you live in?

Start presenting to display the poll results on this slide.
SAFRAN AIRCRAFT ENGINES AT A GLANCE

€6.6bn
REVENUES IN 2021

15,000 PEOPLE
INCL. OVER 11,000 IN FRANCE
at Dec. 31, 2021

Over 30 sites
INCL. 14 IN FRANCE
A global footprint

Support & services
FOR A GLOBAL FLEET OF
over 20,000 ENGINES

75% OF SAFRAN’S R&T BUDGET AIMS TO REDUCE THE IMPACT OF AIR TRANSPORT ON THE ENVIRONMENT*
SAFRAN AIRCRAFT ENGINES WORLDWIDE

BELGIUM
- Safran Aircraft Engines
- Brussels Services

CHINA
- Sichuan Aero Services
- Engine Maintenance Company
- Safran Aircraft Engines
- Suzhou
- Safran Aircraft Engines
- Guiyang

UNITED ARAB EMIRATES
- Safran Aircraft Engines
- Middle East

UNITED STATES
- CFAN (San Marcos - TX)
- CFM International Inc. (Cincinnati - Ohio)
- CFM Materials
- (Grand Prairie - TX)
- Propulsion Technologies
- (International (Miramar, FL)
- Safran Aerospace
- Composites (Rochester, NH)

INDIA
- Safran Aircraft Engines
- HAL Aerospace pvt ltd
- (Bangalore)
- Hyderabad

IRELAND
- Shannon Engine Support

MOROCCO
- Safran Aircraft Engines
- Services Morocco
- (Casablanca)

MEXICO
- Safran Aéro Composites
- Mexico (Querétaro)*
- Safran Aircraft Engine Services America
- (Querétaro)
- Safran Aircraft Engines
- Mexico (Querétaro)

POLAND
- Creuzet Polska
- (Sedziszow)
- Safran Aircraft Engines
- Poland (Sedziszow)

RUSSIA
- Poluevo Invest (Rybinsk)
- Smartec (Moscow)
- Volgaero (Rybinsk)

FRANCE
- Ceramic Coating Center
- (Châtellerault)
- Famat (Saint-Nazaire)
- Powerjet (Villaroche)
- Safran Aéro Composite (Commercy)
- Safran Aircraft Engines Bordeaux
- Safran Aircraft Engines Châtellerault
- Safran Aircraft Engines Evry-Corbeil
- Safran Aircraft Engines Gennevilliers
- Safran Aircraft Engines Istres
- Safran Aircraft Engines Le Creusot
- Safran Aircraft Engines Montreau
- Safran Aircraft Engines St-Quentin-en-Yvelines
- Safran Aircraft Engines Villaroche
- Tarmac Aerosave (Tarbes)
- Airfoils Advanced Solutions (Sars-et-Rosières)

Production
- Design, R&D
- Services, MRO
- Other

Sites
Subsidiary (majority owned)
50/50 joint ventures
Joint ventures and other interests

* Trade name
INDUSTRIAL CHALLENGE: TRIPLE RAMP-UP

COMMERCIAL

PRODUCTION RATE OF 2,000 LEAP ENGINES DELIVERED BY END 2023

MILITARY

DOUBLING OF M88 PRODUCTION RATE TO SUPPORT EXPORT DELIVERIES

SERVICES

CFM56 SHOP VISITS TO PEAK IN 2025–26: 2,500 SHOP VISITS/YEAR GROWTH IN LEAP SHOP VISITS FROM 2025
CSR COMMITMENTS

Corporate social responsibility (CSR) is at the heart of our development strategy. Our goals:

BE AN EXEMPLARY EMPLOYER

EMBODY RESPONSIBLE INDUSTRY

AFFIRM YOUR CITIZEN COMMITMENT

DECARBONIZE AERONAUTICS
Introducing AS13100: AESQ Quality Management Requirements

SAE AS13100 AESQ QUALITY MANAGEMENT SYSTEM REQUIREMENTS FOR AEREO ENGINE DESIGN AND PRODUCTION ORGANIZATIONS

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 complementing the business of suppliers with similar customers, the primary focus of this new standard is to improve overall product quality.近く in the key systems and components of the engine, the new standard ensures a consistent level of quality.

Those common supplemental requirements are not to raise the bar for already high performance in these key areas, and therefore and distantly advanced is provided to ensure clarity of expectations. To ensure customer satisfaction, the selector, space, and defense industry organizations, now to produce-and-and continue-throughout-safety, volatile products that supply to assembly customer requirements, and to those extension-...in the engine and the resulting diversity of organizational impact requirements. And requirements have to be conditioned to the requirements. End product organizations face the challenge of ensuring the quality of product design and development from concept throughout the world and at all levels within the supply chain, industry sectors facing the challenge of delivering products to multiple customers having varying quality expectations and requirements.

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

AESQ – Aerospace Engine Supplier Quality Strategy Group
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AERO ENGINE SUPPLIER QUALITY GROUP (AESQ) OVERVIEW

LISA CLAVELOUX
SR. DIRECTOR, QUALITY
RAYTHEON TECHNOLOGIES
PRATT & WHITNEY DIVISION
Aero Engine Industry- The world ten years ago

- Customers expect Zero Defects
- Airline passengers projected to double in size over the next 20 years
- Increasing level of supplier-made engine content
- Global Supplier Footprint
- Large number of common suppliers between engine manufacturers
- Wide range of Aerospace engine supplier businesses, from <$1M to >$2B
- Improving Safety, Quality, Delivery and Cost remained a key challenge

Aero Engine Manufacturers created a Collaboration working group in 2013 to address the challenges with key Global Suppliers

Used the Automotive example of QS-9000 with Ford, GM and Chrysler as the model
Aero Industry Requirements Flowdown in 2012

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
Aero Industry Requirements Current State

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

AERO Engine Manufacturers

AESQ AS13100 Quality Management Requirements
(Supplemental Requirements to AS9100 & AS9145)

AERO Engine Manufacturer Specific Requirements
e.g. SABRe, S-1000, ASQR-01, SaFE

Aero Engine Supply Chain
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.
Guiding Principles

- Simplify and Standardize Aero Engine supplier requirements through the removal of duplication and waste
- Create a common language for Quality
- Build on existing industry standards, where they exist
- Create Requirements that are simple, prescriptive, and auditable
- Deliver results quickly
- Promote the use of standardized 3rd party training
- Focus on effective & supportive deployment
AESQ Strategy Group Members

Barbara Negroe  
Executive Sourcing Quality Leader  
GE Aviation

Lisa Claveloux  
Sr. Director Quality  
Raytheon Technology Corp.

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

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

Thomas Frank  
Senior VP Corporate Quality  
MTU Aero Engines

James Clifton  
Global Quality Director  
Precision Castparts Corp.

Osa Omoruyi  
VP Quality  
Howmet Engine Systems

Jun Sakai  
Chief Engineer  
IHI Corporation

AESQ – Aerospace Engine Supplier Quality Strategy Group  
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Defect Prevention Tools Must Work as a System
AS13100 OVERVIEW
STRUCTURE & KEY HIGHLIGHTS

EARL CAPOZZI
ASSOCIATE DIRECTOR, DISCIPLINE CHIEF
QUALITY & PROCESS ENGINEERING/SUPPLIER QUALITY
PRATT & WHITNEY
Product Life Cycle & Current AESQ Document Interaction

1. Planning
   - AS9145 (PDP)
   - Kick Off
   - End of Concept (PDR)

2. Product Design & Development
   - Design Records & DRA
   - Process Flow Diagram
   - PFMEA
   - Control Plan
   - AS13004 – PFMEA & Control Plans

3. Process Design & Development
   - Packaging, Preservation & Labelling
   - MSA
   - ICS
   - FAI
   - AS13003 – Measurement Systems Analysis
   - AS13006 – Process Control Methods

4. Product & Process Validation
   - Production Readiness Review
   - AS9102 FAIR
   - Production Process Run
   - AS13002 – Inspection Frequency Plans

5. Ongoing Production, use and Post Delivery Service

AESQ – Aerospace Engine Supplier Quality Strategy Group
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AS13100 Creation Process

Starting Point
September 2018

Existing Engine Maker Supplier Requirements

Harmonized Requirements

Requirements

Existing & WIP AESQ Standards

Supporting Guidance & Best Practice Material

AES13100 Standard

AS13100 Creation Process

Overall Number of Requirements reduced by >50%

Future Engine Maker Supplier Requirements

Requirements

Supporting Guidance & Best Practice Material

AESQ Reference Manuals

AS13100 – Aerospace Engine Supplier Quality Strategy Group

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# AS13100 Structure

<table>
<thead>
<tr>
<th>AS13100 Requirements</th>
<th>Chapter A 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>
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<tbody>
<tr>
<td>Clause Number</td>
<td>1 2 3 4 5 6</td>
<td>1 2 3 4 5 6</td>
<td>DFMEA Product KCs Process Flow Diagram PMEA Process KCs Control Plan MSA Process Capability</td>
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</tbody>
</table>

## 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

Designed to Include Customer Specific 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
- Defines company specific key roles and accountabilities for approvals
- Includes specific IT interface requirements
## AS13100 Requirement Highlights

### Organization Types

1. **Type 1: Make to Print**
2. **Type 2A: Design and Manufacture**
3. **Type 2B: Design Only**
4. **Type 3: Distributor**
5. **Type 4: Special Process**
6. **Type 5: Raw Material**

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>
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</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
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 Guidance Material will be made available to support the deployment of AS13100.

Also integrates draft standards on Audit (AS13005) and Sub-tier Management (AS13007)

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
- AS9146 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)

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)

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

Organizations are required to comply with the customer’s Supplier Code of Conduct and implement their own (Section 5.1.2.1).
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.

(Section 7.2.1)

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

(Section 7.2.4)

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

(Section 7.2.2)

Organization’s to produce an Annual Audit Report to summarize performance for Customer Review

(Section 9.2.3)
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 (8.4.2.2)

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

Specifications of use of AS5553 Counterfeit Electrical, Electronic and Electromechanical Parts and AS6174 for Counterfeit Material (Section 8.1.4.1 & 8.4.2.3)

The organization shall verify that the correct metallic raw material is used e.g. through the use of hand-held spectrometry. (Section 8.5.1.1)

Customer Scorecards

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)

8D Problem Solving

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 Guidance Document GD13000. (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
- Major Quality Issues

**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 Core Writing Team: Thank you for sticking with it, every Wednesday, for two & a half years, even during the pandemic, to get it published.
Thank you to the 99 Subject Matter Experts who created the Reference Manuals

Aaron Stahl
Adam Rogers
Ake Winkvist
Andrew Stout
Anil Oenuer
Barrie Hicklin
Benoit Gottie
Björkälv Häkan
Brian Murphy
Carrie Sharkey
Catherine Belgacem
Catherine Catarina-Graca
Charles Barry
Chip Svoboda
Chris Bishop
Chris Craig
Dave Goldberg
Earl Capozzi
Ed Briggs
Erika Grimm
Frederic Vetil
Grant Braun
Helen Djäknegren
Hector Mata-Collado
Helmut Weitmann
Herelio Munoz-Morales
Ian Bentley
Ian Riggs
Inger Henström
James Kelly
Jim Barge
Jim Nelson
Jim Wilson
Jonas Nickel
John Calder
Jule Hegwood
Jun Sakai
Jun Teshima
Karen Scavotto
Karl Evans
Kristin Gantz
Larry Bennett
Lars Brander
Laura Hill
Lena Wendel Eckerbom
Lise Brox
Ludovic Chevet
Marc Boursicot
Marie Partridge
Marnie Ham
Mattias Eriksson
Maura Callahan
Melanie Deroo
Melanie Renault
Michael Cera
Michael Cosenza
Michael Fuehner
Michael Gerhmann
Michael Stock
Mike Cosenza
Nathalie Noblet
Nick Watling
Nicolas Reignier
Olivier Castets
Patrice Richen
Paul Gorg
Paul Hacker
Perr Rendell
Pete Bilbie
Pete Teti
Peter Papadopoulos
Phil Bamforth
Rebecca Lemon
Ricardo Banuelas
Rich DeMary
Richard Baker
Richard Bolingbrook
Rob Farndon
Robert Starcke
Roger Persson
Rudi Braunrieder
Simon Gough-Rundle
Song Gao
Stefan Gehring
Stefan Lund
Steve Christensen
Steven Finup
Susie Neal
Sverker Johnson
Thomas Herter
Thomas Schmitt
Tobias Kranz
Todd Angus
Tony Pailing
Vince Miller
Ward Baun
Wilibald Schoder
Wolfgang Wagner
Yvonne Mansson
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-itic.org
AERO ENGINE SUPPLIER QUALITY GROUP (AESQ) OVERVIEW
DEPLOYMENT & TRANSITION TO AS13100

Catherine CATARINA
Supplier Management System Coordinator
Safran Aircraft Engines
TRANSITION TO AS13100 FROM AS130XX

AS9145 – Requirements for Advanced Product Quality Planning and Production Part Approval Process. 2016 - November

AS13000 – Problem Solving Requirements for Suppliers - 8D 2014 - May

AS13001 – Delegated Product Release Verification Training Requirements 2015- February
AS13002 – Inspection Frequency Plans 2015 - March
AS13003 – Measurement Systems Analysis 2015 - February

AS13004 – PFMEA & Control Plans 2017 - August
AS13006 – Process Control Methods 2018 – September
TRANSITION TO AS13100 FROM AS130XX

With the adoption of AS13100 we:
- Reduced set of requirements from **174 pages** to **102 pages** a 49% reduction in pages
- “Shalls” reduced more than **23%**
- With the addition of:
  - Human Factors
  - Sub-tier Management
  - Internal Audit and Auditor Competencies
  - Design and Development
- AS13100 leverages the AESQ developed Reference Manuals (RM13xxx) as guidance on how to comply to requirements stated in AS13100. 603 pages of free guidance.
AS13100 Creation Process

Starting Point
September 2018

AS13100 Standard

Requirements

Existing & WIP
AESQ Standards

Harmonized Requirements

Existing Engine Maker
Supplier Requirements

OEM Unique Requirements

Future Engine Maker Supplier Requirements

Supporting Guidance & Best Practice Material

AESQ – Aerospace Engine Supplier Quality Strategy Group
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Major Changes within AS13100

Five new key areas within AS13100 to focus Producers

AS13100 leverages the AESQ developed Reference Manuals (RM13xxx) as guidance on how to comply to requirements stated in AS13100.

P&W to utilize reference document when educating supply base

- RM13000 Problem Solving Methods (8D)
- RM13002 Alternate Inspection Frequency Plans
- RM13003 Measurement System Analysis
- RM13004 Defect Prevention Quality Tools
- RM13005 Quality Audit Methods
- RM13006 Process Control Methods
- RM13007 Sub Tier Management
- RM13008 Design Work
- RM13009 Compliance Assessment (with Form) -- GAP ASSESSMENT
- RM13010 Human Factors
- RM13011 Rework and Production Repair of Non-Conforming Products
- RM13102 First Article Inspection
- RM13145 Advanced Product Quality Planning (APQP) and Production Part Approval Process (PPAP)

Updates likely required to your QMS
AS13100
DEPLOYMENT INTRODUCTION
& MILESTONES

HELEN DJAKNEGREN
DIRECTOR SUPPLIER QUALITY & DEVELOPMENT
GKN AEROSPACE
Where are we?

- March 2021: AS13100 Publication
- October 2021: Deployment Started
- April 2022: Deployment Ongoing
- Target: December 31, 2022 - Transition Complete
AESQ Deployment Team Milestone Plan

Key milestones to achieve compliance to AS13100 by 12/31/2022

1. AS13100 Publication
2. SAE Press Release
3. Reference Manuals published
4. Virtual Supplier Forum 4/21/21
5. Amend AS9100 Compliance Matrix with AS13100 supplementary requirements
6. Perform Gap Analysis to AS13100 supplementary requirements Rm13009
7. Virtual Supplier Forum 10/6/21

8. Update QMS requirements
9. Train employees in New Requirements
10. Conduct internal AS13100 Pre-Audit
11. Close Gaps with Corrective actions
12. Supplier Pulse

3 MONTHS LEFT

Supplier now subject to AS9100/AS13100 audit

Aerospace Engine Supplier Quality Strategy Group

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Committed to AS13100 compliance on December 31, 2022

All OEMs have released supplier quality requirements invoking AS13100
Compliance Expectations

What can I expect on January 1st, 2023 when AS13100 becomes contractual?

• AESQ members will be checking compliance with their own suppliers individually
• All suppliers will need to be able to demonstrate compliance to AS13100
  – Best method to do that is to complete the RM13009 Self-Assessment and provide a copy to AESQ customers that request it along with any gaps that were identified and the plan/timetable to close those gaps.
  – Producing an Annual Audit Report outlined in AS13100 Section 9.2.5 and described in RM13005 covering 2022 audits, while not technically required, would also be a good way to demonstrate to all AESQ customers that internal and sub-tier audits are under control
• AESQ members may request to see each supplier’s 2023 internal and supplier audit plans meeting the requirements of AS13100
• AESQ members may begin to audit to the requirements of AS13100 in order to confirm compliance with high-risk suppliers
The AS13100 Quality audits team is also working on an improved AS13100 Self-Assessment checklist and plan to have it published by year end.

**AS13100 Chapter A Master Audit Checklist**

<table>
<thead>
<tr>
<th>Section</th>
<th>Paragraph</th>
<th>Requirement Description</th>
<th>AS13100 Reference Material</th>
<th>Auditor Guidance</th>
<th>Compliance Level</th>
<th>Auditor Comments</th>
<th>Opportunities for Improvement</th>
<th>AESQ Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.3.3</td>
<td>1</td>
<td>Certification requirements - Table 2</td>
<td></td>
<td>Ensure the Organisation meets the minimum requirements of Table 2. Note: Individual AESQ members may have differing requirements.</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>4.3.4</td>
<td>1</td>
<td>Access to O&amp;O datasheets and Nadcap Information</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.3.5</td>
<td>1-3</td>
<td>Annual AS13100 compliance assessment RM13009</td>
<td></td>
<td>look for evidence of a self-assessment in the last 12 months and that any gaps have been addressed. The AS13100 self-assessment checklist or a copy of this checklist are performed but not mandatory.</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>4.4.3</td>
<td>1</td>
<td>Human Factors Included in OMS RM13010</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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</tr>
</tbody>
</table>

**Goals include:**

- Include guidance, where applicable, both to describe objective evidence needed or to guide Auditors in interpreting the section’s “shall” consistently across different Auditors/AESQ members
- Include references to RM documents for more information
- Include an indicator that an AESQ member has additional requirements to each question in their own documents
AS13100 Auditor Training Requirements

RM13005 improvements under review

- Correcting significant grammar, punctuation, and spelling issues
- Improving the interpretation of the Lead Auditor and Internal Auditor training requirements
- Examining the expectation by the AESQ members for what activities Lead Auditors are responsible for
- Reviewing the ongoing Auditor certification requirements for Special Process Auditors (e.g. # audits per year)
- Addressing requirements for suppliers not certified to AS9100
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
• Basic AS13100 familiarity

April 2022: Follow up survey targeted to better understand the aero-engine supply base’s AS13100 implementation status
• 13 questions, both objective and open-ended
• 482 respondents to date
• 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
• Develop plans based off the feedback and help suppliers are asking for
• 255 respondents to date
Survey Evolution

AS13100 Familiarity

- I have read the AS13100 Standard and some or all of its 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

Survey results for Sep 2021, Apr 2022, and Sep 2022.
Survey Evolution

Implementation Status Evolution

- 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
Who Responded?

Respondent's Customers

Respondents had an average of 3.75 AESQ customers

Number of Respondents

GE Aviation 180
Rolls-Royce 160
Pratt & Whitney 140
Safran 120
MTU Aero Engines 100
Honeywell 80
GKN Aerospace 60
IHI 40
Howmet Aerospace 20
PCC Structurals 10

Respondents had an average of 3.75 AESQ customers
Resources are available for implementation concerns
What are the specific concerns with implementing APQP?
What are the specific concerns with implementing Human Factors?
Smaller businesses are asking for help in implementation

AESQ can help:
• Member companies will partner with their suppliers to close gaps
• Communities of Practice on LinkedIn are available
• Best Practice Examples from three suppliers today
Training requirements and how the AESQ can help

Intent:
• Company needs to understand the requirements of the standard for deployment

Expectations:
• People shall complete the 3 Day Foundations training. If not trained by year end, the Foundations training will need to be in the closure plan.

How can the AESQ help?
• More Live training sessions (Oct)?
• Options to certify a companies training?
• Auditor training class from AESQ?
• Do we want a COP of deployment to smaller co.?
In response to your feedback....

In today’s event you will see:
• Training overviews and opportunities
• How to get involved in AESQ
• FAQs and places to ask questions (highlights of the Communities of Practice on LinkedIn)
• Best practice examples from three partner suppliers
APQP AND PPAP
ADVANCE PRODUCT QUALITY PLANNING
PRODUCTION PART APPROVAL PROCESS

KARL EVANS
APQP TECHNICAL PROJECT MANAGER
ROLLS-ROYCE
AS13100 APQP and PPAP

Requirements are achievable through alignment of best practices.

- AS9145 Published: 2016
- AS13100 Published: 2021

AS9145

AS13100 APQP & PPAP

RM13145

AS13100 APQP & PPAP
Why APQP & PPAP for Aerospace?

The primary objective is to **improve quality and reduce cost**. **Higher quality** is synonymous with **increased product safety**.

**Cost of Quality through Product Life Cycle**

- **APQP & PPAP**
- **Current State**

**Development**

- Proactive tools *focuses cross-functional teams on risk identification & mitigation* early in the process.

**Production**

- **Products reach faster maturity with fewer engineering changes and defects** in the early stages of production & product use.
- ** Provides a foundation for successful ongoing change management** – design and/or manufacturing change, Works Transfers.

DEVELOPING PRODUCT &/OR PROCESSES WHEN IN PRODUCTION IS COSTLY –
- Redesign
- Re-qualifications
- Escape Investigations

Source info...

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View APQP as a Flight
OUR FLIGHT PATH FOR MANAGING PRODUCT AND OR PROCESS CHANGE

Product Development Process (PDP)

Phases of Advanced Product Quality Planning (APQP)

1. Planning
2. Product Design and Development
3. Process Design and Development
4. Product and Process Validation
5. On-going Production, Use and Post-delivery Service

AESQ Production Part Approval Process (PPAP) Events

Product Status

Prototype/test product Production trial products Production products
The APQP Flight Path

OUR FLIGHT PATH FOR MANAGING PRODUCT AND / OR PROCESS CHANGE

Planning deliverables
Get off the ground...

APQP & PPAP Elements
Specifics we do on the journey...

- Design
- Develop
- Validate

APQP & PPAP Events
Our flight path checks....
When do you apply APQP and PPAP?

When required by your customer and for:

- New Design or change
- Transfer from one facility to another
- New manufacturing process or change

When introducing new product, facility, process or changing these change situations (APQP) > Activity

APQP Element list (basis of the Project Plan)

Of the list some are PPAP Elements (PPAP Submission)

(PPAP) > Evidence

- Organisation Responsibility
- New v change
- Product & Customer

RM13145

Configure for the "Change Situation"
Leadership Test

**Referring to Planning deliverables (x8), APQP & PPAP Events (x12) and APQP & PPAP Elements (x27).**

Are each and everyone required to be used every time? (NPI, Works transfer, manufacturing changes)

**Referring to APQP design, development and validation activities for product & processes.**

Should these be solely delivered by one function within your business?

**Referring to the use of APQP & PPAP Events – your flight path checks.**

Should these be an integrating part of your organisations Project Management & Review structures?

---

It's a team sport…
How capable is your business in deploying APQP?
ANY QUESTIONS?
TEI TUSAS ENGINE INDUSTRIES
AS13100 IMPLEMENTATION
STRATEGY

Turgut ÇİÇEK
DIRECTOR, QUALITY AND MANUFACTURING ENGINEERING
TEI TUSAS ENGINE INDUSTRIES, INC.
Company Profile

- 38 Years in Aviation
- Over 3030 Employees
- 6 Locations, 2 Subsidiaries
## Business Activities

### Customers
- GE Aviation
- Safran Aircraft Engines
- Rolls Royce
- GKN Aerospace
- Honeywell Aerospace
- MTU Aero Engines
- POC Structural, Inc.
- Howmet Aerospace

- 25 Customers in Aviation
- Have business relations with 9 of 10 Strategy Group Members of AESQ

### Approvals
- AS9100 and AS9110
- EASA Part 145 & on course to get FAA Part 145
- On course to get SHT-21 POA & DOA
- Most Nadcap accredited processes granted by an engine company among 4000+
- NDT Training and Examination Center
Business Activities

Parts and Module Manufacturing
- 50 Engine Programs
- 1500+ Parts
- 53 Special Processes
- The Biggest Prime Supplier for LEAP & GENX Engines

Engine Assembly, Inspection and Testing (AIT)
- F110 Engine Derivatives
- T700-TEI-701D Engine
- Test Cells for Turbofan and Turboshaft Engines

Maintenance, Repair and Overhaul (MRO)
- F110 Engine Derivatives
- T700-TEI-701D Engine
- Makila 1A1 Engine
- TF33 Engine
- CTS800 Engine
- UAV Engines
- Component Repair for LEAP

Engine Design and Product Development
- TEI-TS1400 Turboshaft Engine
- TP400-D6 Engine RRSP
- UAV Engines

AS13100 Organization Type 1 and Type 2a
AS13100 TEI Status on Milestone Plan

Distribution / sharing of Information on AS13100 Training

Develop plan for adoption and deployment

Conduct internal stakeholder’s meeting on plan and deployment approach

Provide organization-wide awareness training on AS13100 to promote adoption and deployment

Update QMS procedures to close gaps

Conduct Internal AS13100 Pre-Audit with C/A’s

Close Gaps with C/A’s

AS13100 Requirements now in effect

1. AS13100 Publication
2. SAE Press Release
3. Reference Manuals Publication
4. Virtual Supplier Forum 4/21/21
5. Perform Gap Analysis to AS13100 supplementary requirements RM13009
6. Virtual Supplier Forum 10/6/21
7. Amend AS9100 Compliance Matrix with AS13100 supplementary requirements
8. Virtual Supplier Forum 4/28/22
9. Train employees in new requirements
10. Develop plan for adoption and deployment
11. Conduct internal stakeholder’s meeting on plan and deployment approach
12. Provide organization-wide awareness training on AS13100 to promote adoption and deployment

AS13100 TEI Status on Milestone Plan

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AS13100 TEI Implementation Approach

119 employees attended implementation project so far from cross-functional teams. 21 employees with the implementation responsibility attended AESQ AS13100 Requirements Training.
AS13100 TEI Implementation Project

Team Members

Documents

AESQ – Aerospace Engine Supplier Quality Strategy Group

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Working Group Highlights

Safety Management

Training & Awareness

Just Culture
Working Group Highlights

For Every Characteristic
Live Document
Digital Integration
Working Group Highlights

Training
Stress Test on Pilot Parts
Working Group Highlights

Team Members

Current View - Find an Item - Search

- Karan Sezer
  - Kalemi Teknik Lisans: Kimya ve İnşaat Mühendisi
- Bora Yilmaz
  - Kalemi Teknik Lisans: Kimya ve İnşaat Mühendisi
- Oktay Akci
  - Kalemi Teknik Lisans: Kimya ve İnşaat Mühendisi
- Bülent Acar
  - Kalemi Teknik Lisans: Kimya ve İnşaat Mühendisi
- Esra Dursun
  - Kalemi Teknik Lisans: Kimya ve İnşaat Mühendisi
- Tozlu Engin
  - Kalemi Teknik Lisans: Kimya ve İnşaat Mühendisi
- Emre Kavas
  - Kalemi Teknik Lisans: Kimya ve İnşaat Mühendisi
- Merve Kurbas Birlik
  - Kalemi Teknik Lisans: Kimya ve İnşaat Mühendisi
- İsmail Çelik
  - Kalemi Teknik Lisans: Kimya ve İnşaat Mühendisi
- Murat Kulaş
  - Kalemi Teknik Lisans: Kimya ve İnşaat Mühendisi
- Murat Bircan Özkul
  - Kalemi Teknik Lisans: Kimya ve İnşaat Mühendisi
- Fevzi Zorlu
  - Kalemi Teknik Lisans: Kimya ve İnşaat Mühendisi
- Aysin Okan
  - Kalemi Teknik Lisans: Kimya ve İnşaat Mühendisi
- Bora Zorlu
  - Kalemi Teknik Lisans: Kimya ve İnşaat Mühendisi
- Mahmut Yilmaz
  - Kalemi Teknik Lisans: Kimya ve İnşaat Mühendisi
- Ali Ateş
  - Kalemi Teknik Lisans: Kimya ve İnşaat Mühendisi

AESQ – Aerospace Engine Supplier Quality Strategy Group

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APQP and PPAP Progress

<table>
<thead>
<tr>
<th>JAN</th>
<th>FEB</th>
<th>MAR</th>
<th>APR</th>
<th>MAY</th>
<th>JUN</th>
<th>JUL</th>
<th>AUG</th>
<th>SEP</th>
<th>OCT</th>
<th>NOV</th>
<th>DEC</th>
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</thead>
<tbody>
<tr>
<td>GE Supplier Quality Newsletter</td>
<td>Internal document issued</td>
<td>PFMEA training from PQE</td>
<td>Maturity Matrix</td>
<td>RACI for deliverables</td>
<td>TEI NPI DigiX</td>
<td>Project Tracking System</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>2020</td>
<td>2021</td>
<td>2022</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Preparation of TEI training documents</td>
<td>Develop PPAP Elements Templates for TEI</td>
<td>APQP awareness to managers and leaders</td>
<td></td>
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</tr>
<tr>
<td>APQP training from BSI</td>
<td>Kick Off with GE PQE</td>
<td>Core Team formed</td>
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<tr>
<td>PFD/PFMEA special processes templates</td>
<td>General Risks for Processes</td>
<td>Improve system for Phase 5</td>
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<tr>
<td>Tracking APQP Status of Pilot Parts with GE</td>
<td>Improve/update check lists of APQP phases</td>
<td></td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>Pilot Parts Selection</td>
<td>Core Team formed</td>
<td>APQP/PPAP digitization software</td>
<td>Training to engineers</td>
<td>MSA Training</td>
<td></td>
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</tr>
</tbody>
</table>
First PPAP submitted this month.
Compliance Assessment Progress

85% | 77% | 80% | 82% | 75% | 69% | 77% | 75% | 75% | 76% | 80% | 75% | 79% | 76% | 65% | 80% | 85% | 78% | 95%

Clause 3 | Clause 4 | Clause 5 | Clause 6 | Clause 7 | Clause 8 | Clause 9 | Clause 10 | Clause 11 | Clause 12 | Clause 13 | Clause 14 | Clause 15 | Clause 16 | Clause 17 | Clause 18 | Clause 19 | Clause 20 | Clause 21 | Clause 22
Summary

1. Strong supporter of holistic approach for OEM Supplier Requirements.
2. Committed to full AS13100 compliance on December 31, 2022.
3. Significant resource needs to implement for large suppliers.
4. Integration to Digital and Lean is crucial for sustainability.
SOURCE OF POWER

Thank You
LEISTRITZ TURBINENTECHNIK GMBH
AS13100 IMPLEMENTATION STRATEGY

THOMAS DÜLBERG
BUSINESS UNIT QUALITY SYSTEM MANAGER
LEISTRITZ TURBINENTECHNIK GMBH
AS13100 Implementation Plan @ MTU

MTU AERO ENGINES AG – Markus Braig
1.) Project plan to achieve AS13100 compliance by January 1st 2023

- **MTU QMS assessment**
  - Project preparation
  - Project authorization
  - Delta identification
  - Definition of need for action
  - Gap closure and specification updates
  - AS13100 Trainings

- **MTU supply chain flow down**
  - SQN Supplier Information
  - Deployment support through the technical supplier Management MTU

- **MTN94111**
  - MTN94111 New release: Incorporation of AS13100 requirements
  - MTN94111 Release & Supplier Information

---

**Internal Compliance Self-Assessment**

**MTU AS13100 compliant**

---

AESQ supplier forum - MTU implementation
2.) AS13100 Deployment & MTU Aero Engines AG Supply Chain

- Regular updates of AESQ/AS13100 activities per Supplier Quality Notifications (SQN) to the complete MTU supply base
- Highlighting AS13100 deployment on every Management Meeting, Supplier visits etc.
- Direct Communication between suppliers quality organization and the allocated MTU Technical Supplier Management key account in order to:
  o To provide opportunity for asking questions to MTUs AS13100 deployment team
  o To gain understanding of suppliers problems and needs
  o To obtain regular feedback
  o To obtain deeper insight in the progress of deployment process
- **MTN94111 new revision**, incorporating AS13100, will be published November 2022.

To give one of our suppliers the opportunity to share their approach and experience in deploying AS13100 we invited Leistritz Turbine Technology, major supplier for compressor airfoils to MTU for the last 50 years, to participate in the AESQ AS13100Supplier Forum here in Massy.
Leistritz - Introduction of AS 13100

AESQ meeting dated 21 October 2022
Mr. Thomas Dülberg
Quality Director for the Business Unit Leistritz Turbine Technology
and responsible person for AS 13100 implementation.

E-mail: tduelberg@leistritz.com
phone: 0049 (0) 172 8408 745
www.leistritz.com
Introduction of AS 13100

Overview of the Leistritz Group

Represented in 21 industries:

Introduction of AS 13100

Overview of Leistritz Turbine Technology

4 Locations
Europe and Asia

Sales p.a.
~ 76 Mio.

Staff Force
~ 700

- DIN EN ISO 9100 and 9001
- DIN EN ISO 45001 work safety
- DIN EN ISO 14001 environmental
- DIN EN ISO 50001 energy
- DIN EN ISO 17025 laboratory

- Heat treatment
- Chemical processing
- Non destructive testing
- Shot blasting

Managing Director
Bernd Kretschmer
Ulrich Strieder

NPI
Torsten Koslowski

Quality
Thomas Dülberg

Controlling
Jörg Roesler

Sales, Marketing, Purchase, IT, HR

Plant Manager Remscheid
Carsten van Dyck

Plant Manager Nuremberg
Harald Brand

Plant Manager Thailand
Kongsuwan Chalat

Plant Manager Belisce
Zoran Pepic
Introduction of AS 13100

Our Manufacturing Expertise

Groundbreaking technology for tomorrow's turbines

Forging
- Precision forging
- Isothermal forging

Machining
- ECM (electrochemical machining)
- PECM (pulsed ECM)
- Milling
- Grinding
- Polishing
- ND Testing
Our Product Range

Partner to all leading OEMs and component suppliers in the Aero Engine Industry

Our product range:

- Aero engine airfoils & Segments
- Aero engine discs & blisk
- Structural parts
- Titanium aluminide turbine blades
- Metal Leading Edge
Introduction of AS 13100

Beginning - Information

• When did I first hear about the new AS 13100 requirement?
  At the beginning of 2021 during the AESQ Supplier Forum in April 2021.

• What was my first thought after the 4 hours information meeting?
  Yet, another new requirement from our customers that has to be implemented, and now in the current Corona situation.

• What were the first steps?
  Informing the management and all executives about the contents of AS 13100 and about the very committed time schedule.

• What were the reactions?
  The whole range of reactions:
  • What is new?
  • who will pay us for all this effort?
  • what benefit does Leistritz get from this new requirement?
  • What costs will we incur?
  • aso.....
Introduction of AS 13100

Step 1

Preparation of a generally understandable presentation for all managers, at all locations, with the new requirements and possible advantages for the Leistritz Turbine Technology company after the introduction of AS 13100.

Create understanding / Basics for AS 13100 implementation

- Clear commitment from general management!
- Define responsible person with appropriate rights of access
- Define a team; implementation of AS 13100 is not only a quality task!

Start the project

- Install meetings to discuss the self assessment
- 5-10 hours for each location
- Different gaps at the individual locations.

Create corrective actions and discuss it with customer. Set a timetable and communicate changes promptly.
Introduction of AS 13100

Status of Self Assessment

Remscheid, Germany

Chonburi, Thailand

Nuremberg, Germany

Belisce, Croatia

Create and implement a corrective action plan for each site:

<table>
<thead>
<tr>
<th>Gaps for Remscheid site:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Intensify Work with Business Continuity Plans</td>
</tr>
<tr>
<td>• Regularly measure the effectiveness of human factors</td>
</tr>
<tr>
<td>• FOD – implement in additional processes</td>
</tr>
<tr>
<td>• Intensify risk management for supply chain</td>
</tr>
<tr>
<td>• add 13100 requirements in all procedures......</td>
</tr>
</tbody>
</table>

→ The individual gaps differ from site to site, because not every site has engineering, for example.
Introduction of AS 13100

Step 2

13 additional specifications
Dispatch specifications to the individual departments in order to detect further gaps and to define corrective actions
• From customer view, the introduction of AS 13100 reduces the requirements for the supplier by 50%.
• This may be true for the headlines, but each of the manuals listed has up to 90 pages of requirements.

Communication with customer
Mid of 2021, MTU contacted us and asked us to draw up a general timetable for the introduction of AS 13100.
• This was the starting point to intensify the efforts for the introduction of AS 13100.
• The exchange of information with other customers is not as intensive.
  • From Leistritz point of view a platform would make sense on which every supplier can document his progress and every customer has access to it.

External training of AS 13100 requirements
• Knowledge to be distributed to all managers with a snowball system
• Annual training of all employees via the electronic training system EPLAS
Introduction of AS 13100

Step 3

internal audits
• conduct internal audits in November 2022
• self-assessment of how far AS 13100 has been implemented.
• establish new plan in case of open gaps
• communicate the results and the corrective action plan to customer

Open questions
• Will all customers accept this internal Leistritz self-assessment?
• or does every customer want to check the status of the introduction of AS 13100 on site himself?

Quality documents
• Revision of all Q-documents according to AS 13100 (priority on Quality Management Manual and Procedural Instructions (other documents in the specified time period)).

Final step
• At the beginning of 2023, the management of Leistritz Turbine Technology will send an official statement to all customers, that AS 13100 has been successfully implemented.
Introduction of AS 13100

Benefits

Intensify APQP / PPAP Processes
- documented Run & Rate Phase
- detect failures at an early stage and they are effectively eliminated
- less rejects, lower costs, more stable processes

Intensify Risk management
- Dealing with potential failures already in the planning phase
- Avoids high change efforts and delivery delays
- Risks are identified in advance and Leistritz can implement preventive actions
- Risk assessment of the supply chain

Support of the existing zero defect strategy
- Improved delivery capability
- Achieve world class level in scorecards and thus preference for new customer projects
- Avoidance of concessions
Conclusion

- No supplier will be able to ignore these changes if they want to remain active in the aviation business. In the long run, there is also a benefit for Leistritz Turbine Technology through the improvement of processes, reduction of rejects...

- The introduction and implementation must be responsibly handled by production, engineering, HR and quality.
Thank you for your attention!
PARKER MEGGITT
AS13100 IMPLEMENTATION STRATEGY

SORAYA BARJ
QUALITY & AIRWORTHINESS MANAGER
PARKER MEGGITT
AS13100 Deployment Strategy

AS13100 – Parker Meggitt Group implementation

ENGINEERING YOUR SUCCESS.
Agenda

• Parker - Meggitt site coverage
• Timeline
• Milestone Status by Site
• Cumulative performance
• % Compliance by sites
• Combined compliance
• Key Risks / Gaps
• Training
• Summary
• Next steps
# Parker - Meggitt Sites

<table>
<thead>
<tr>
<th>Site</th>
<th>Quality Rep</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ansty Park</td>
<td>Pepe Elsworth</td>
</tr>
<tr>
<td>Cincinatti</td>
<td>Jim Morano</td>
</tr>
<tr>
<td>Erlanger</td>
<td>Eric Carter</td>
</tr>
<tr>
<td>Fareham</td>
<td>Tom Williams</td>
</tr>
<tr>
<td>Fribourg</td>
<td>Stéphane Marchetti</td>
</tr>
<tr>
<td>Loughborough</td>
<td>Les Elphee</td>
</tr>
<tr>
<td>Irvine</td>
<td>Cynthia Melchior</td>
</tr>
<tr>
<td>North Hollywood</td>
<td>Ramon Williams</td>
</tr>
<tr>
<td>Oregon</td>
<td>Jeff Bryson</td>
</tr>
<tr>
<td>Portland</td>
<td>Justin Hackett</td>
</tr>
<tr>
<td>Saltillo</td>
<td>Daniel Mendoza</td>
</tr>
<tr>
<td>San Diego E&amp;E</td>
<td>Chris Harris</td>
</tr>
<tr>
<td>San Diego ES</td>
<td>Emmanuel DeBrand</td>
</tr>
<tr>
<td>Simi Valley</td>
<td>Greg Lewin</td>
</tr>
<tr>
<td>Troy</td>
<td>Sandy Hendrickson</td>
</tr>
<tr>
<td>Vietnam</td>
<td>Thao Nguyen</td>
</tr>
<tr>
<td>Xiaman</td>
<td>Amanda Wang</td>
</tr>
</tbody>
</table>

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Parker - Meggitt AS13100 Timeline

- AS13100 Review: Jan 2022
- Training 13100 Requirements Course
- Training Exec Overview: Mar 2022
- Gap Analysis Review: May 2022
- Site performs Gap Analysis per RM13009: Start: Jan 2022
- Submit to Group: End April 2022
- Gap Closure (inc. G8MS update): Start: June 2022
- Complete end: Sept 2022
- Internal Audit: gaps closed: Nov 2022
- 31 Dec 2022
- Data submitted to customer as required, and site subject to audit as needed
Milestone Status By Site

Milestone 6-Sept
Cumulative Performance

- All sites are at 61% to the milestones, should be at 67%
- 1 site currently has not submitted their gap analysis bringing the overall % down
- Documents recently released at the Group level are driving training and communication and will close quite a few gaps
% Compliance by Site submissions (RM13009)

Overall Compliance by Site

Vietnam: 98%
Group: 97%
Fulbourn: 96%
Oregon: 93%
Kewan: 93%
Cincinnati: 90%
Loughborough: 90%
Farham: 89%
San Diego E&F: 89%
Inver: 88%
Troy: 78%
Eckswor: 77%
Sunlho: 70%
Simi Valley: 70%
San Diego Engines: 69%
Artsy: 69%
Neko: 49%
Portland: 0%
Combined AS13100 compliance
Overall Compliance All Sites
### Key Risks/Gaps

<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.4.3</td>
<td>Quality Management System and its processes - Supplemental Processes: Human Factors</td>
<td>MQA-1 Quality Manual Updated &amp; Released</td>
</tr>
<tr>
<td>5.2.1.1</td>
<td>Establishing the QP - Human Factors</td>
<td>MQA-33 Human Factors Created &amp; Released</td>
</tr>
<tr>
<td>7.1.5.1.1</td>
<td>MSA</td>
<td>MSA not currently being performed on quite a few sites, retrain on material</td>
</tr>
<tr>
<td>7.1.5.1.2</td>
<td>Conduct MSA</td>
<td></td>
</tr>
<tr>
<td>7.1.5.1.3</td>
<td>Confirm Acceptance of MSA</td>
<td></td>
</tr>
<tr>
<td>7.1.5.1.4</td>
<td>Agree Improvement Actions -MSA</td>
<td></td>
</tr>
<tr>
<td>7.2.4</td>
<td>AESQ Quality Foundation Training</td>
<td>Parker Meggitt 3 - Day Foundations Course Being Launched</td>
</tr>
<tr>
<td>7.3.1</td>
<td>Human Factors Awareness</td>
<td>MTR-31 Human Factors Training Underway</td>
</tr>
<tr>
<td>7.5.3.4</td>
<td>Damage to Records - Inform Customer</td>
<td>MQA-20 Updated &amp; Released</td>
</tr>
<tr>
<td>8.5.1.2.1</td>
<td>Validation and Control of Special processes - Supplemental Requirements</td>
<td>Sampling of NDT - MQA-31 Inspection - Under Peer Review. To Be Released on 10/21</td>
</tr>
<tr>
<td>9.2.5</td>
<td>Annual Audit Report</td>
<td>Being Conducted Monthly - Sites Need Rolled up Performance</td>
</tr>
<tr>
<td>9.3.2.1</td>
<td>Management Review Inputs - Supplemental Requirements</td>
<td>Human Factors To Be Considered - Clarify to Sites</td>
</tr>
<tr>
<td>19.1</td>
<td>Pre-Launch Control Plan</td>
<td>To Be Instituted On Next New Project/Design</td>
</tr>
</tbody>
</table>
Training

• Level one – SAE Executive overview, completed by all applicable sites

• Level two – SAE AS13100 requirements course (10 hours approx.), completed by all applicable sites

• Level three – SAE 3 day Quality foundations course, Completed by Group Head of Manufacturing Quality
  
  • Parker Meggitt will deliver equivalent 3 day quality foundations course for applicable sites (Pilot course TBC for end of Nov 2022 @ Ansty Park)

• Parker Meggitt has its own Learning academy and all required training is available. Approx. 800 Meggitt engineering professionals have been trained this year in all 14 foundation course modules
Parker- Meggitt AS13100 Summary

- Monthly site leadership review ongoing
- Monthly Group review with sites is ongoing
- GE - AS13100 Quarterly reviews
- Milestone Tracker – reported monthly
- Gap closure is aided by GBMS updates
Next steps

• Group Quality to Continue to work with sites to mitigate risks & close Gaps

• Complete Gap assessment audits

• Deliver pilot AESQ equivalent 3 day foundations course to all applicable sites

• Share best practices /lessons learned with all applicable sites
AS13100 IMPLEMENTATION
QUESTION & ANSWER
TRAINING OVERVIEW

EARL CAPOZZI
ASSOCIATE DIRECTOR, DISCIPLINE CHIEF
QUALITY & PROCESS ENGINEERING / SUPPLIER QUALITY
PRATT & WHITNEY
Executive Overview

Introducing SAE AS13100
The New Industry Standard for Quality

This exciting new standard creates a common language for quality throughout the supply chain.
Watch our video series for executive perspectives from across the industry, and learn how compliance is critical to your company’s success.
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
7.2.4 AS13100 Requirements Training and AESQ Quality Foundations Training - Supplemental Requirements

The organization shall 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 Management Standards through an AESQ approved AS13100 Requirements training course. This course is also recommended for functional leaders responsible for creating or managing processes that are impacted by AS13100 Requirements.

In addition, the organization’s Quality Leaders with responsibility for supporting the design, manufacturing, and assembly operations via AS13100 shall undergo training in the AESQ Quality Foundations Training course. This course is also recommended for design engineering, manufacturing engineering and operations roles.

Equivalent training that meets the AESQ AS13100 Requirements and Quality Foundations course syllabi shall be approved by the AESQ.
# Required Training

<table>
<thead>
<tr>
<th>Delegated Product Release Verification (DPRV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DPRV personnel shall be trained and certified in accordance with AS13001 Delegated Product Release Verification Training Requirements</td>
</tr>
<tr>
<td>(7.2.3) Requirement since 2015</td>
</tr>
</tbody>
</table>

<table>
<thead>
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</tr>
<tr>
<td>(7.2.4) Requirement since 2022</td>
</tr>
</tbody>
</table>
Certified by Probitas Authentication™ an independent third party. They track attendees and maintain everyone's ongoing credentials and record against the requirements.

In the aerospace industry, the Delegated Release Process Verification process establishes a uniform set of requirements by which a supplier may be granted authority to ship product. This removes or minimizes source and/or receiving inspection by the delegating organization, or their third-party representatives.

Successful completion of this course satisfies the respective customer training requirement for initial self-release delegate qualification.
Required & Suggested Additional Training

LEVEL ONE
- AS13100 Executive Overview
  - Launched Q3 2020
  - No cost
  - Five Part Video Series, 35 minutes
  - Executive perspectives from across the industry detailing why compliance is critical to your company's success

LEVEL TWO
- AS13100 Requirements
  - Launched Q2 2021
  - $399

LEVEL THREE
- AS13100 Quality Foundations
  - Launched Q1 2022
  - $1095

LEVEL FOUR
- 8D Problem Solving
- Measurement System Analysis
- FMEA & Control Plans
- Human Factors
- APQP / PPAP (incl. AS9145)
- Lead Auditor Training
- Internal Auditor

Suggested Additional Training
This exciting new standard creates a common language for quality throughout the supply chain.

Watch this free video series with executive perspectives from across the industry and how compliance is critical to your company’s success:

1. The Aerospace Industry
2. Formation of AESQ
3. The Need for AS13100
4. Overview of AS13100
5. Summary
AS13100 Webinars

On ongoing series of short videos: *Live and On Demand*

Executive perspectives from across the industry detailing how AS13100 compliance will affect these topics:

- AS13100 APQP and PPAP for Supply Chain To RM13145
- AS13100 Design FMEA to RM13004
- AS13100 What Makes a Good 8D? RM13000
- AS13100 First Article Inspection (FAI) to RM13102

No cost
AS13100 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.
SAE AS13100 Quality Requirements Course

Is this On Demand Course for You?

✔ Individuals accountable for defining the organization’s processes or developing its quality management system to meet customer, regulatory, and industry requirements.

✔ Quality Leaders and those leaders from other functional areas:

- Design
- Business
- Program Management
- Engineering
- Manufacturing
- Auditors
- Operations
- Purchasing
SAE AS13100 Quality Requirements Course

This course is On Demand, and includes 10 modules aligned to the AS13100 Standard:

- Introduction to AS13100 (Intro to Section 3)

- **Chapter A**: 9100 Quality Management System – Requirements for Aviation, Space and Defense Organizations – AESQ Supplemental Requirements

- **Chapter B**: AS9145 Advanced Product Quality Placement (APQP) and Production Part Approval Process (PPAP) – AESQ Supplemental Requirements

- **Chapter C**: Core Defect Prevention Quality Tools to Support APQP and PPAP – Supplemental Requirements
QUALITY FOUNDATIONS COURSE
OVERVIEW
✓ **Required** for Quality Practitioners with accountability for deploying the requirements of AS13100.

✓ **Recommended** for functional practitioners responsible for creating, managing or deploying processes that are impacted by AS13100.

**Exception** for GE Suppliers who have prior attendance in Supplier Orientation or QF204/GE Aviation Supplier Training.
This three-day course is offered either online, or on-ground.

Key quality systems, processes and methodologies to show how they work as part of a system focused on defect prevention.

Supports quality professionals, at all levels in the organization, to understand how these tools and processes work and what are the characteristics of successful deployment.

Recommended for functions with accountability for the quality of the design, production, assembly and test areas of the organization.
SAE AS13100 Quality Foundations Course

Is this Course for You?

✓ Individuals operationalizing the organization’s processes and deploying its quality management system to meet customer, regulatory, and industry requirements.

✓ Quality practitioners and those from other functional areas:

- Design
- Business
- Program Management
- Engineering
- Manufacturing
- Auditors
- Operations
- Purchasing

The intent is, at a minimum, site quality leaders will attend training.
OEM REQUIREMENTS SESSION

Gokhan Kulali
GE Aviation

Ian Riggs
Rolls-Royce

Earl Capozzi
Pratt & Whitney
Canada

Denis Pottier
Safran Aircraft
Engines

Catherine Catarina
Safran Aircraft
Engines
AS13100 Customer Specific Requirements – GE Unique

Intro

GE S-Specs – Quality Requirements – Special Processes

Section 4

Priority parts review
Affiliate requirements

Section 8

Order of precedence
Change in design – electronic application
Source Problem Reports
Purchased raw material – testing requirements
Fastener supplier requirements
AS13100 Customer Specific Requirements – GE Unique

Section 8 (Continued)
- APQP – Applicability based on manufacturing complexity/risks
- Serialization – numbering
- Hardware Release – DSQR
- Electronic nonconforming material process

Section 9
- Alternate inspection – electronic application
- Product Audit requirements

Section 16
- FAI per S-1002
- PPAP – submission based on manufacturing complexity/risk

Section 17
- PPAP submission- electronic application/process
AS13100 Customer-Specific Requirements; Rolls-Royce

SABRe 3; Full compliance to all previous requirements

Section 4.3 Determining the Scope of the Quality Management System
   New supplier approval type and AS13100 compliance

Section 6 Actions to Address Risks and Opportunities
   Comply with the Rolls-Royce Supplier Enhanced Cyber Security Standard

Section 8.1.3 Product Safety
   Conduct training every 4 years on product safety supported by Product Safety Awareness Briefing pack developed by Rolls-Royce

Section 9.1.1.1 Monitoring and Measurement of the Manufacturing Process
   Achieve the Process Minimum Standards using the Benchmarking Assessment Tool for applicable processes
   - Acceptable Compliance by End 2022; Required process minimum standard agreed with RR and a plan in place to complete the assessments by end of 2023

Section 10.3 Continual Improvement
   Demonstrate a commitment to zero defects by establishing the appropriate improvement plans and programmes
AS13100 Customer-Specific Requirements – P&W

Intro

Clarification of AS13100 and the RM’s

Section 4

60 days to incorporate new requirements

Deliverable software to ASQR-07.5 (and non-deliverable in Section 8)

Multiple additions to QMS Certification Requirements Table 2

Section 7

Significant-Out-Of-Tolerance on M&TE equipment

Table 4: MSA Acceptance Limits – new Gage R&R acceptance levels

P&W DPRV program requirements

Retention period starting date

Retention on radiographs of non-serialized parts

Section 8

Critical parts per ASQR-09.1

P&W-specific forms to communicate
AS13100 Customer Specific Requirements – P&W

Section 8 (cont.)

- Handheld spectrometry only on request
- Operator self-verification programs needing P&W approval

Section 9

- Sampling to ASQR-20.1 and alternate inspection approvals
- Product and Production Process Audits included in risk analyses only

Section 10

- Verification of corrective actions – 3 manufactured lots
- Temporary Key Characteristics

Section 17

- PPAP submission- submission, approval, deferral, and element contents

Section 18

- Not applicable to P&W

Section 21

- Initial Process Capacity studies requirements
# Gaps Analysis AS13100 vs SAFe

## AS13100 Requirements
- Section 7.2.1
  - Requires organizations to provide On the Job Training

## AS9100 Rev D Supplemental Requirements
- Clause Number 1 to 10
- Chapter A
  - AS13100 Requirements

## AS9145 Supplemental Requirements
- Chapter B
  - APQP & PPAP Requirements

## Defect Prevention Quality Tools to Support APQP & PPAP
- Chapter C
  - Process Flow Diagram
  - Failure Mode Effect and Criticality Analysis (FMECA)
  - Process Control Plan
  - Measurement System Analysis (MSA)

## SAFe vs AS13100
- Common AS13100 & SAFe
- SAFe (44)
- AS13100 (20)

## Examples
- Section 7.2.1
  - AS13100 Requirements training and AESQ Quality Foundations Training
- Section 7.2.(2&4)
  - AS13100 Requirements training and AESQ Quality Foundations Training
- Section 8.5.1.1.1
  - Control of Equipment, Tools, and Software - Supplemental Requirements

## Covered vs Not Covered
- SAFe vs AS13100
  - 16% Covered
  - 84% Not Covered
More SAFe versus AS13100: Some examples

Chap. 5 Corporate Social Responsibility

Chap.7 Regulatory watch process

Chap.8 Obsolescence

Chap.10 Scrap rate

AESQ – Aerospace Engine Supplier Quality Strategy Group
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AS13100 FAQ PANEL SESSION

Barrie Hicklin
Honeywell

Karl Evans
Rolls-Royce

Earl Capozzi
Pratt & Whitney

Catherine Catarina
Safran Aircraft
Engines

Ian Riggs
Rolls-Royce
ZERO DEFECTS JOURNEY

BARRIE HICKLIN
SR. DIRECTOR, QUALITY SYSTEMS & REGULATORY COMPLIANCE HONEYWELL AEROSPACE
Why do we need to get to Zero Defects?
Does your company formally recognize Zero Defects as a goal?
How would you rate your capability to assess a programme of Zero Defects?
What do you see as your greatest barrier?
What would help you most?

1. Start presenting to display the poll results on this slide.
“Get Involved” with AESQ

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

- Click “Get Involved”
“Get Involved” Options

1. Sign up to receive AESQ eNewsletter
2. Become an AESQ Member
3. Join the SAE G-22 Committee
4. Join a Community of Practice on LinkedIn

Click on the appropriate link for additional information
“Get Involved” – Sign up to Receive AESQ’s eNewsletter

• Issued monthly

• Learn about AESQ’s current activities

• Complete online form to begin receiving
“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.
• Required to participate in the work of AESQ by providing resources to support AESQ working groups.
• 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 is now open for anyone to join.

Community of Practice Members
- Problem Solving Methods: 263
- First Article Inspection (FAI): 239
- Defect Prevention Tools: 366
- Design Work & Production Repair: 127
- Quality Audit Methods: 251
- Sub-Tier Management: 167
- Measurement Systems Analysis (MSA): 188
- Human Factors: 124
- DPRV: 178
- APQP & PPAP: 319
- Process Control Methods: 90
- Compliance Assessment: 1
- Alternate Inspection Frequency: 7

LinkedIn Groups for each Community of Practice is now open for anyone to join.
“Get Involved” – Subject Matter Interest Groups

- Follow AESQ’s Subject Matter Interest Groups
- Sign up for a Subject Matter Interest Group Webinar

<table>
<thead>
<tr>
<th>AESQ Subject Matter Interest Groups</th>
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</thead>
<tbody>
<tr>
<td>Advanced Product Quality Planning (APQP) &amp; Production Part Approval Process (PPAP) RM13145</td>
</tr>
<tr>
<td>Design Work &amp; Production Repair &amp; Rework RM13008 &amp; RM13011</td>
</tr>
<tr>
<td>Sub Tier Management RM13007</td>
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<tr>
<td>Human Factors RM13010</td>
</tr>
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<td>DPRV Training RM13001</td>
</tr>
<tr>
<td>First Article Inspection RM13102</td>
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</tbody>
</table>

AESQ Strategy Group is creating a collaborative community where engine OEMs and suppliers work together to address shared challenges.
AESQ Posters

- Download to Print
- 3 Sizes Available
  - 11” x 17”
  - 36” x 24”
  - 108” x 72”
“Get Involved” – Additional Options

- Attend AESQ Events (Supplier Forums, Webinar) or Watch Video Online
- Take a AS13100 Training Course
- Download Reference Manuals
- Watch the “Zero Defects” Video
AESQ Thanks You for Attending!

Stay in Touch: aesq.sae-itic.com