Smallpeice Enterprises
a division of GP Strategies Limited

Aligned with AS13100

2023 Training Programme
for Aerospace Sector

- SABRe4 (for Rolls-Royce Suppliers)
- AS13100 Overview
- Zero Defects Leadership
- APQP / PPAP (AS9145)
- Human Factors (RM13010)
- Problem Solving (AS13100 / RM13000)
- MSA (AS13100 / RM13003)
- Process FMEA (AS13100 / RM13004)
- Process Control (AS13100 / RM13006)

Aerospace Specific Training Solutions for leaders & practitioners

Updated Training Options for 2023

The Smallpeice 2023 curriculum offers new programmes and practitioner training aligned to the latest AS13100 requirements for Zero Defects, Problem Solving & Quality Tools,. AS13100 is supported by a series of Reference Manuals (RM) that provide additional detail on certain subjects to describe the intent of the standard and to provide guidance on deployment. Training is available via an extensive calendar of open enrolment classes, or in-company group training which can be linked to company examples and supported with coaching to embed best practice.

Coaching

Whilst all courses provide practical training in the effective implementation of the tools – returning to the workplace to tackle live activities can raise new challenges and issues. This is where follow-on coaching and mentoring support can make a real difference in helping to fast-track skills, confidence and competencies. Please contact us via train@smallpeice.com, or +44 (0)1926 336423 to discuss options available.

Competency Framework

Training can also be supplemented with an accreditation framework that provides formal assessment and qualification of practitioner levels of competency. The certification framework requires participants to submit a portfolio of applications for review by a Smallpeice assessor – ensuring that FMEA, MSA, 8D, Process Control projects are correctly implemented with best practice standards and aligned to the AS standard requirements.

Our clients include:

Rolls-Royce, Parker, GKN, MEGGiTT, pattonair, Druck, MOOG, UMW, THALES, RLC, SAFRAN, MB AEROSPACE, PCC, SAESL, Triumph Group, Inc.

For bookings & enquiries
email train@smallpeice.com
Tel +44 (0)1926 336423
www.aerospacesuppliertraining.com

Open Enrolment: 2023 Course Calendar

Our virtual training programmes incorporate multi-media features and are delivered by masterclass trainers.
Following enrolment, participants will be issued with MS Teams invites in readiness to log-on to the masterclass webinar modules.

	Duration	Page	Fee	2023 Dates		
AS13100 Overview	4 hours	Page 4	190 GBP	Nov 2 (1pm – 5pm UTC)		
SABRe4 Essentials	4 hours	Page 5	190 GBP	Oct 13 (12pm – 4pm UTC)	Nov 15 (12.30pm – 4.30pm UTC)	
Zero Defects Leadership	3 days	Page 6	In-company only			
APQP/PPAP Foundation aligned with AS9145	4 hours	Page 7	190 GBP	Dates to be confirmed		
Human Factors Awareness aligned with RM13010	4 hours	Page 8	190 GBP	Oct 2 (8am – 12pm UTC)		
8D Problem Solving aligned with AS13100 / RM13000	1½ days	Page 9	395 GBP	Dates to be confirmed		
MSA aligned with AS13100 / RM13003	1½ days	Page 10	395 GBP	Dec 4 – 6 (12.30pm – 4pm UTC)		
Process FMEA aligned with AS13100 / RM13004	1 day	Page 11	250 GBP	Dates to be confirmed		
Process Control aligned with AS13100 / RM13006	3x 3½ hours	Page 12	395 GBP	Dates to be confirmed		

Fees include:

- Live training via MS Teams
- Supporting course materials

Booking Process:

- Please email Smallpeice via train@smallpeice.com with your enquiry / requirements.
- Our experienced booking team will then liaise with you to complete the enrolment process.

AS13100 Overview

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Open Enrolment

- 4 hours duration
- £190+VAT per delegate
- Live virtual delivery via MS Teams

Next Dates

- **November 2**
  (1pm – 5pm GMT/UTC)

In-Company

- Ideal for group training
- Customised per company

Suppliers with multiple customers have had to previously conform to a variety of quality requirements. This has resulted in different standards of practice. Recently, key aerospace engine manufacturers, through the organisation AESQ, have collaborated to produce the standard AS13100 which is now becoming the basis for many company quality standards. This industry harmonisation has resulted in a focused set of requirements. This course covers the new requirements of AS13100 to enable companies to plan their transition and compliance.

- Understand the structure and purpose of AS13100
- Obtain a thorough overview of the objectives, content and benefits of the standard
- Recognise the important relationships with other aerospace standards
- Be able to consider your organisation's current state and compliance

Programme of content

Introduction to AS13100

- AS13100 Scope, Structure, Benefits & Objectives
- Relationship with other Aerospace Standards and Requirements
- Reference to Applicable Documents
- Terms & Definitions

Chapter A: Quality Management System Requirements

- Context of Organisation
- Leadership, Planning & Support
- Operation
- Performance Evaluation & Improvement

Chapter B: APQP & PPAP

- Application & Scope
- Terms & Definitions
- APQP Requirements
- PPAP Requirements

Chapter C: Core Defect Prevention Quality Tools

- Quality Tools Overview
- Tool Linking and Flow

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SABRe4 Essentials

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Open Enrolment

- 4 hours duration
- £190+VAT per delegate
- Live virtual delivery via MS Teams

Next Dates

- **October 13**
  (1pm – 5pm BST /
  12pm – 4pm GMT/UTC)
- **November 15**
  (12.30pm – 4.30pm GMT/UTC)

In-Company

- Ideal for group training
- Customised per company

SABRe is the well-established Rolls Royce standard for supply chain quality. This standard has evolved over 20 years and is now in its 4th Edition. Industry standards have been used as the foundation for many of its requirements. Recently, key aerospace engine manufacturers, through the organisation AESQ, have collaborated to produce the standard AS13100. – which is now the basis for SABRe4. This industry harmonisation has resulted in a reduced set of unique Roll Royce requirements. This course covers the new requirements and structure of SABRe4 and is designed to help suppliers to transition from SABRe 3 to the new edition. Smallpeice are the official global trainers for Rolls-Royce SABRe courses. The course enables participants to:

- Navigate through the SABRe4 standard & understand the relationship with other aerospace standards
- Recognise the key differences from SABRe3 and the resultant benefits
- Familiarise with the Rolls Royce supplemental requirements stipulated in SABRe4
- Identify the requirements profile of each supplier type
- Understand the links to the key principles of APQP and PPAP
- Understand the use of the Self Assessment tool and the process for achieving certification

Post Training Knowledge Test & Certificate:

- An online multi-choice knowledge test will consolidate the learning and provide evidence of understanding of key elements
- A certificate of successful training attendance will be issued after the test is completed

Programme of content

Part 1: Introduction to SABRe4
- Transitioning from SABRe3
- Relationship with other aerospace standards
- Links with the AS13100
- Supplier types
- Benchmarking assessment
- SABRe4 structure and roadmap

Part 2: Chapter A – Quality Management System Requirements
- Requirements applicability
- QMS certification requirements

Part 2: Chapter A – Quality Management System Requirements (continued)
- Planning & support
- Operation
- Performance evaluation
- Continual improvement

Part 3: Chapter B – APQP & PPAP
- APQP
- PPAP
- Supply chain risk management process

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Zero Defects Leadership

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In-Company

- Ideal for group training
- Customised per company

This programme is focused on practical working and discussion to support the drive to Zero Defects in the design and manufacturing workplace and wider supply chain. The challenge of making sure that our processes are always 'on target' with 'minimum variation' is a key aspect of achieving our target of Zero Defects. Leadership must ensure that we create systems that enable the achievement of Zero Defects; display behaviours that help create an environment where the drive for Zero Defects is the norm; and coach their teams in the core technical tools.

- Provide the context for the Drive for Zero Defects journey.
- Demonstrate the key Zero Defects tools
- Enable leaders to ask the right questions to establish the current state and build the business case for quality.
- Commit to leading the Zero Defect programme and lead by example

Programme of content

Zero Defects Philosophy
- The vision statement and description of the key principles
- Supplier management / organisational capability
- Alignment to external standards

Advanced Quality Planning Design with DFMEA
- The Design FMEA process
- Strategies to improving the Risk Profile (RPNs)

Process Planning with PFMEA & Control Plans
- PFMEA and the Advanced Quality Planning System
- Constructing a PFMEA and Control Plan

Inspection Capability/Measurement Systems Analysis
- Introduction to MSA – objectives and benefits

Statistical Process Control (SPC) and Process Capability
- Objectives and benefits of improved capability
- Process capability indices

Being Fitter for the Future with APQP & PPAP
- The business need for APQP
- The PPAP Process and the 21 Elements

Mistake Proofing
- Why mistakes are made
- Mistake Proofing and Zero Defects
- Leadership skills required for mistake proofing solutions

Coaching for Zero Defects
- How we lead and the shadow of the leader
- High performance culture behaviours
- Zero Defects as a Change program

Structured Problem Solving
- Overview the 8D methodology and the need to effectively engage people in supporting the 8D process
- Getting to the root cause and developing permanent corrective actions
- Prevent Reoccurrence Actions and Lessons Learnt

Overcoming Resistance to Change and Influencing Skills
- Coaching for improvement
- Dealing with difficult questions

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APQP/PPAP Foundation
aligned with AS9145

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Open Enrolment
- 4 hours duration
- £190+VAT per delegate
- Live virtual delivery via MS Teams

Next Dates
- Dates to be confirmed

In-Company
- Ideal for group training
- Customised per company

APQP drives a quality focused approach to product development through the use of a phased planning process. It consists of five phases starting with conceptual product needs and extending throughout the product life cycle. This training is aligned with the AS9145 standard which defines the aviation, space, and defence process requirements for Advanced Product Quality Planning (APQP) and Production Part Approval Process (PPAP). This programme blends together the most powerful components of effective and impactful learning. Specifically designed for virtual delivery, the training is based around a step by step case study which ensures participants understand and practise every state of the APQP process. The training is led by our master Aerospace trainer who brings unrivalled expertise and experience from working with the major players in Aerospace and a broad spectrum of global clients.

Programme of content

Preparatory e-Learning & reading (to be completed in advance of the training)
- E-Learning: Introduction to APQP
  Reading: AS9145 standard

Introductions
- Introductory icebreaker group exercise
- APQP as a driver for Zero Defects

APQP Phase 1: Project Planning
- Selecting members for an APQP team
- Review the customer job & spot improvement opportunities
- Critique the inputs/outputs of the milestone review meeting
- Complete the Phase 1 of your APQP roadmap
- Exercise Debrief
- Milestone review disciplines
- Modifying the framework for the differing NPI projects

APQP Phase 2: Product Design & Development
- Select the right tools for this phase from the toolkit
- Summarise expected outputs from this phase: what is the focus & why ?
- Complete the Phase 2 of your APQP roadmap graphic

APQP Phase 3: Process Design
- Select the right manufacturing tools for this phase from the toolkit
- Review the key document provided: what are we looking for / what questions do we need to ask ?
- Complete the Phase 3 of your APQP roadmap graphic

APQP Phase 4: Validation (PPAP)
- Introduction to PPAP;
- the production process run;
- The PPAP file & submission & approval process
- Quiz: what are we looking for / what questions do we need to ask ? What tasks must we schedule to complete this phase ?

APQP Phase 5: Ongoing Production
- Review Production Scenarios & make your decisions/choices via multi-choice quiz

Summary & Debrief
- Review of the APQP roadmap & gearing up for action

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Aligned with RM13010

Human Factors Awareness
aligned with RM13010

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Open Enrolment

- 4 hours duration
- £190+VAT per delegate
- Live virtual delivery via MS Teams

Next Dates

- **October 2**
  (9am – 1pm BST /
  8am – 12pm UTC)

In-Company

- Ideal for group training
- Customised per company

The concept of 'Human Factors' represents the way that People, Programmes & Processes, the Work Environment, Organisation and Equipment - all work together as a system. With the individual at the centre of that system: any flaws in the system impact the performance of the individual, and any flaws in the individual impact the system. Evidencing that Human Factors have been considered is now a mandatory requirement embedded into the SAE AS13100 standard and as such a reference manual RM13010 has been written to provide supplemental information and guidance on this key topic. This half-day workshop provides a concise introduction to the range of human factors that can affect performance and which should considered in relation to any improvement or problem solving campaign.

Once the concept of human factors is understood, the workshop will move on to considering tactics that can be used to improve the management of these issues which can otherwise create errors and which should be considered within any design, change management, or root cause investigation.

A mix of theory and interactive group activities / discussions will help delegates to understand what Human Factors will mean back in the workplace and what course of actions are required to meet the RM 13010 standard.

Programme of content

Introduction to Human Factors

Human Performance and Limitations
- Exploring vision & hearing
- Information processing; attention and perception; memory
- Phobias / restrictions in the workplace that impact issues

Teamwork / Safety / Organisational factors / Professionalism
- Social psychology; responsibility: individual and group
- Motivation & de-motivation; peer pressure; 'culture' issues
- Management, supervision and leadership

Physiological Factors Affecting Performance
- Fitness/health; Stress: domestic and work related
- Workload: overload and underload
- Sleep fatigue, shift work; alcohol, medication, drug abuse
- Time pressures that contribute to problems

Environment & Hazards in the Workplace
- Noise & fumes: illumination; climate & temperature
- Motion & vibration
- Is our working environment conducive to working well

Misunderstanding Processes & Procedures
- Badly written SOPs, ambiguous Instructions,
- Shift handovers, Silo mentality between depts
- How clear are our current instructions ?

Summary & next actions
- Group discussion: 'where are we now / how do we move forward'
- Application within your workplace
- How do we create a 'Just Culture'?
- What do we need to do next?

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8D Problem Solving
aligned with AS13100/RM13000

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Open Enrolment
- 1½ days of live training
- £395+VAT per delegate
- Live virtual delivery via MS Teams

Next Dates
- Dates to be confirmed

In-Company
- Ideal for group training
- Customised per company

The AS13100 standard requires that aerospace suppliers use the 8D process to respond to a customer request for corrective and preventive action. By implementing a robust and structured problem solving approach it is possible to correctly identify the root causes to prevent future occurrence. Applying the 8D toolkit also requires many skills in analytical thinking and decision making, and develops best practice behavioural and leadership skills which can then transfer to any business or team challenge. The training sessions are based around a step-by-step case study to practice using the tools and techniques during team activities

Programme of content

Introduction to 8D
- The process from customer complaint to lessons learnt
- How the enabling quality tools are essential throughout
- Cost of poor quality & improving quality
- Building in quality rather than inspecting it out
- Different CI / problem solving methods
- Importance of SME's and E = Q x A
- D0 Emergency Response & Prepare for 8D
- Simple process flow
- How do we become aware of the problem?
- Emergency response, the need for containment

D1 Form the Team
- Process flow diagram
- Team roles & stakeholder management
- RACI &GRIP - Importance of communication

D2 Define the Problem
- Process flow diagram & analysing the data
- Fact based, importance of going to Gemba
- Developing a problem statement
- Understanding value stream & who could be affected
- Setting SMART goals
- Introduction to Is / Is not analysis

D3 Develop Containment Actions
- Is the ERA good enough or do we know more now
- Have we truly mitigated the risk (FMEA)
- Do we have good data (MSA)

D4 Identify & Verify Root Cause
- Need to establish true root cause: 3 stage analysis
- Importance of data collection planning
- Verifying the root cause

D5 Identifying Corrective Actions
- Mistake proofing
- Picking the right solution (payoff matrix & criteria)

D6 Implement Corrective Actions
- Importance of stakeholder buy in
- The need for trials
- Control mechanisms, ensuring a good handover

D7 Define & Plan Preventative Actions
- What failed to allow the problem to occur
- How can we benefit from lessons learned
- What documents need to be reviewed or revised

D8 Recognise the Team
- Reflection on how the team & process worked
- Importance of recognising our successes

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Measurement System Analysis
aligned with AS13100/RM13003

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Open Enrolment
- 3x 3½ hour modules
- £395+VAT per delegate
- Live virtual delivery via MS Teams

Next Dates
- **December 4 to 6 2023**
  (12.30pm – 4pm GMT/UTC each day)

In-Company
- Ideal for group training
- Customised per company

Measurement Systems Analysis (MSA) is an experimental technique used in the workplace to support improvement by evaluating and determining how much error there is within a measurement system. The AS13003 standard stipulates the requirements to establish an acceptable measurement system for use on aerospace parts and assemblies. MSA is critical to ensuring process control and quality, and is an essential foundation for process improvement. This practical workshop demonstrates how to assess the performance of new and existing measurement systems and highlights how to introduce improvements when necessary. Participants will learn how to ensure that measurement systems deliver on the key requirements to ensure reliable process control data, and reliably distinguish good parts from bad parts.

- Demonstrate the importance of MSA within a Zero Defects improvement programme
- Understand how to conduct a Measurement System Analysis for Continuous and Attribute data
- Show how to interpret the results of measurement studies to make improvements
- Discuss the organisational challenges in performing measurement studies and how to overcome

Programme of content

Introduction to Measurement Systems Analysis (MSA)
- What MSA is and why it is important to Zero Defects?
- Types of measurement studies available
- Organisational and competence requirements studies

Elements to Consider When Conducting an MSA
- Pre-requisites for conducting the study
- Considerations for planning the study
- Linking MSA to additional quality tool (FMEA, Control Plans, Process Control, 8D)

Measurement Variation / Continuous Data Studies
- Types of data and statistical Concepts of MSA
- Checking the equipment resolution / Accuracy ratio

Continuous Data Studies – Gauge R&R
- Objectives of the study
- Definition of repeatability and reproducibility
- Running the Gauge R&R study
- Actions for improvement

Continuous Data Studies – Type 1 Studies
- Objectives of the study / Running the study
- How to interpret the results and actions for improvement

Continuous Data Studies – Additional Studies
- Linearity Studies; Stability studies; Determining Bias

Continuous Data Studies – Co-Ordinate Measuring Machines
- Special requirements for CMM measurements
- Running the study and interpreting the results

Destructive Measurement Systems

Attribute Data studies
- Introduction to attribute MSA
- Human factors influencing attribute
- Uses for attribute studies
- Setting up the study
- Interpreting the results
- Case studies & examples

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Aligned with AS13100

Process FMEA
aligned with AS13100/RM13004

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Open Enrolment

- 1 day
- £250+VAT per delegate
- Live virtual delivery via MS Teams

Next Dates

- Dates to be confirmed

In-Company

- Ideal for group training
- Customised per company

FMEA is an analytical method to ensure potential problems have been considered, assessed for risk and actioned as part of product and process design. This workshop steps though a practical case study based workshop to cover the Process FMEA and Control Plan requirements for AS13004 as well as highlighting the importance of integrating Design and Process FMEA. Participants will learn how to analyse product features relative to manufacturing processes in terms of risk; identify failure modes and effects: and set priorities using the severity rating scale. The training will:

- Introduce the concept and types of risk management
- Practise the FMEA method & understand the links between the FMEA types
- Learn how to generate the Control Plan & know how special characteristics are managed
- Understand how FMEA links with other quality tools & develop practice in FMEA facilitation

Programme of content

Introduction to FMEA
- Product and process risk assessments & link to Zero Defects
- Challenges of producing Process FMEAs to AS13004 standard

The FMEA Method
Introduction to the FMEA methodology, and link to Design FMEA
- Identify:
  - Failure mode: failure definition
- Assess:
  - Effects & severity: what would be the result of the failure mode and how bad would it be
  - Causes & occurrence: what mistakes could lead to the failure and what are their likelihoods
  - Control & detection: how could failure be detected
  - Current risk: things that need improvement
- Control:
  - Action plan: ideas for improvement
  - Future risk: the impact of the improvements

Process FMEA - Preparation and Identify Phase
- Process boundary setting: what is the subject process
- Process mapping: describing the process
- Design & process linking: Characteristic matrix
- Failure mode identification & specification
- Giving the failure mode some status
- Potential mistake identification and review
- Current process control & its effectiveness
- Evaluating current risk

Process FMEA - Control Phase
- Generation and review of recommended actions
- Action escalation and management
- Outstanding risk after action

FMEA Facilitation (the 5 Ps)
- The use of FMEA reference content
- Preparation – pre-work and ownership
- People – the FMEA team
- Post-event – follow up actions & support

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Process Control
aligned with AS13100/RM13006

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Open Enrolment
- 3x 3½ hour modules
- £395+VAT per delegate
- Live virtual delivery via MS Teams

Next Dates
- Dates to be confirmed

In-Company
- Ideal for group training
- Customised per company

AS13006 sets the standard for implementing Process Control which allows effective management of variation to drive consistency in process outputs and enable continuous improvement. Aerospace suppliers are required to ensure that processes are target set and stable (i.e. in control) and assessed to check they are capable. This workshop introduces SPC as a key tool which can be used to achieve quality improvements by providing a structured approach to monitoring and improving process control. Participants will learn how to construct and interpret control charts, and develop their understanding of why the control chart is the best tool to keep a process under control. The course also covers the link from SPC to process capability and, again, covers the 'how to do it' and 'how does it work' aspects of the subject.

- Understand how to use SPC control charts for continuous and attribute data.
- Show how to conduct and interpret the results of capability studies.
- Understand the links between process control techniques and additional quality tools.
- Discuss the cultural challenges in performing process control studies and how to overcome them.

Programme of content

Introduction to SPC
- Key objectives of SPC: prevention vs detection
- The importance of process centring
- Using data for continuous process improvement
- The limitations of specification-based systems
- Sources, causes and types of variation

Pre-requisites to SPC
- Planning data collection and checking measurement system
- Frequency distributions and normal distribution

Control Techniques
- Overview of mistake proofing
- Pre-control charts; Reduced and sample inspection

Control Charts and their Applications
- Control charts for variables (I-MR, X-Bar R, X -Bar s)
- I-MR. X-Bar R, X -Bar s charts and how to use them
- Links to additional quality tools

SPC Techniques for Special Situations
- Short run SPC
- Handling more than one characteristic

Control Charts for Attributes (P, NP, C, U)
- P and NP charts
- Setting up the charts; interpreting results
- C and U charts

Evaluating Process Capability
- Capability analysis of variables data (Cp,Cpk,Pp,Ppk)
- Dealing with non-normal data
- Single sided tolerances
- Capability analysis for Attribute data (PPM, DPMO)
- Implementing SPC and process capability in the workplace

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