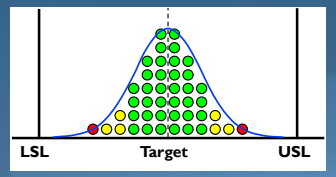
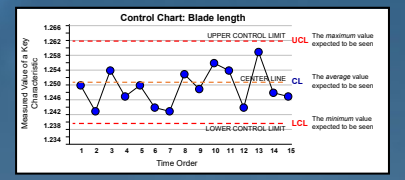
AESQ STRATEGY GROUP™
A Program of SAE ITC

ONE HOUR PROCESS CONTROL ASSESSMENT



Webinar sponsored by the AESQ Process Control Methods SMIG

May 16, 2023



PRESENTORS

Peter E. Teti
Pratt & Whitney
Senior Fellow, Quality Eng.
PCM SMIG Team Leader

- In 39th year at RTX; 27 at HS, 12 at PW
- ASQ CQE, CQA, CMQ/OE
- Adjunct Professor, CCSU – 24 years
- CQE Instructor for 28 years
- Co-author AS13006/RM13006/RM13000
- AS13100 contributor

Dr Ricardo Banuelas
Rolls- Royce
Head of Continuous Improvement and Quality
NA- Defense

- In 18th year at Rolls-Royce (10 in Indianapolis and 8 in the UK)
- Master Black Belt
- Regular lecturer at MSU
- Co-author RM13000
- Co-author of the book “World Class Applications of Six Sigma”

ONE HOUR PROCESS CONTROL ASSESSMENT

Agenda – 60 minutes

- Purpose
- AS13100 Chapter B – APQP & PPAP
- AS13100 Chapter C – Defect Prevention Tools
- Fast review of PFMEA and Control Plans
- Training Availability
- The One-Hour Process Control Assessment
- Implementation Tips
- Q & A

WEBINAR OVERVIEW

We are **recording** today's webinar and will distribute the video link following the close of the webinar. It will also be posted on the AESQ website for free viewing.

We will take **questions** during today's webinar using the **Chat** feature.

Please remain on Mute during the presentation to prevent background noise. We will also be muting all lines at the start of the session.

PROCESS CONTROL METHODS PER RM13006

Purpose of this reference manual

RM13006 provides the user with an array of practical approaches to process control used to ensure consistent product quality.

The purpose of this reference manual is to raise the overall capability of the aerospace engine supply chain, standardize the process control requirements across AESQ suppliers, and build on the requirements for Defect Prevention Quality Tools (ref. RM13004).

RM13006 supports AS9145 - Requirements for Advanced Product Quality Planning and Production Part Approval Process, and AS9103 - Variation Management of Key Characteristics, supported by detailed guidance and case studies.

This reference manual was developed by a dedicated team from AESQ member companies with expert knowledge and experience in the areas of process control, process improvement, quality systems, and supplier engagement.


SAE INTERNATIONAL

AEROSPACE STANDARD

AS13100™

Issued 2021-03

AESQ Quality Management System Requirements for Aero Engine Design and Production Organizations

RATIONALE

This standard has been created by the SAE G-22 Aerospace Engine Supplier Quality (AESQ) Technical Committee to harmonize and simplify supplier quality requirements that are in addition to the requirements of 9100 Quality Management Systems - Requirements for Aviation, Space, and Defense Organizations and 9145 Advanced Product Quality Planning and Production Part Approval Process.

Previously the Aerospace Engine Manufacturers based their supplier quality requirements on 9100 but had differing supplemental requirements and guidance albeit with largely the same intent. These supplemental requirements originate from the need to meet Regulatory, Customer, Industry, and Business requirements that are not explicitly covered by 9100 and 9145.

This standard sets out to create a common set of supplemental requirements with common reference materials to improve understanding, efficiency, and performance. While significantly simplifying the businesses of suppliers with multiple customers, the primary intent of this new standard is to improve overall product quality by focusing on the key systems and processes currently delivering consistent aerospace engine product quality.

These common supplemental requirements aim to raise the bar for anticipated performance in these key areas, and therefore detailed guidance is provided to ensure clarity of expectations.

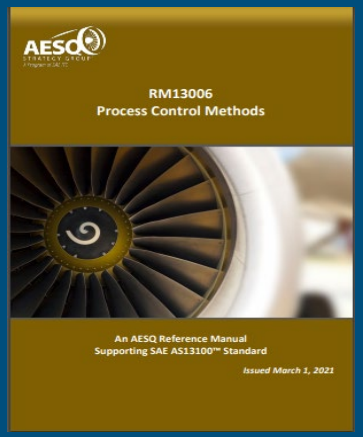
FOREWORD

To assure customer satisfaction, the aviation, space, and defense industry organizations have to produce and continually improve safe, reliable products that equal or exceed customer and regulatory authority requirements.

The globalization of the industry and the resulting diversity of regional/national requirements and expectations have complicated this objective. End-product organizations face the challenge of assuring the quality of end integration of product purchased from suppliers throughout the world and at all levels within the supply chain. Industry suppliers face the challenge of delivering product to multiple customers having varying quality expectations and requirements.

The SAE G-22 Aerospace Engine Supplier Quality (AESQ) Technical Committee was established under the SAE Aerospace Council to develop, specify, maintain, and promote quality standards relating to the aerospace engine supply chain. The principles defined within this standard may be applicable to other segments of the aviation, space, and defense industries.

The AESQ strategy is to promote defect prevention approaches across the supply chain including those associated with Advanced Product Quality Planning and Process Control to enable the supply chain to achieve Zero Defects.



PROCESS CONTROL METHODS SUPPORT

What is the Process Control Methods SMIG Group?

- The purpose of the PCM Subject Matter Interest Group is to promote the effective deployment of the process control methods across the AESQ Supply Chain.
- The Group is made up of Subject Matter Experts from the AESQ Member Companies.
- The Group is accountable for the AS13100 related Requirements and associated Reference Manual content, ensuring that it is up to date and reflects current knowledge and best practice.
- It shall promote the effective deployment of the Reference Manual using Communities of Practice (CoP). The CoP is open to anyone with an interest in process control from the AESQ Member Companies and the wider AESQ supply chain.
- Activities may include webinars, best practice sharing, development of shared training materials, conferences and published papers.

NO.	FUTURE WEBINAR TOPICS	TARGET DATE/TIME
1	**Process Control Methods - What is RM13006?** Interaction with other AESQ Reference Manuals	12/6/2022 (completed)
2	**What makes a good Process Capability Study?**	1/26/2023 (completed)
3	**Process Capability Study for True Position (handling MMC)**	2/8/2023 (completed)
4	**The use of non-statistically based process control methods**	3/8/2023 (completed)
5	**The Power of Precontrol**	4/11/2023 (11 AM U.S. Eastern)
6	**The One-Hour Process Control Assessment**	5/16/2023 (11 AM U.S. Eastern)
7	**Why is statistical control a prerequisite for process capability?**	Target 2nd Qtr (June)
8	**Dealing with Non-Normal Data**	Target 3rd Qtr (September)
9	**Conducting capability studies for one-sided geometric tolerances**	Target 4th Qtr (October)
Go to https://aesq.sae-itc.com/events for webinar schedule		

https://aesq.sae-itc.com/interest-groups

SUBJECT MATTER INTEREST GROUPS

Who is the Process Control Methods SMIG Team?

Curator for RM13006

Experts who you may address process control related question to

Provider of process control related webinars. See Slide 23 for webinar schedule which is subject to change based on your feedback

PROCESS CONTROL METHODS COP

Where to get help

AESQ Supplementary Materials webpage for a copy of RM13006 and supporting templates

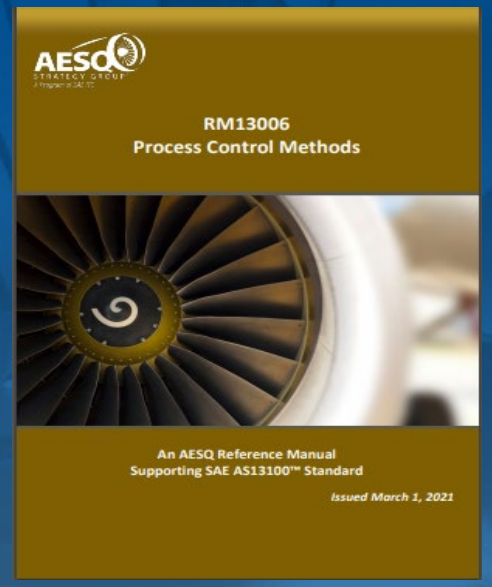
https://aesq.sae-itc.com/supplemental-material

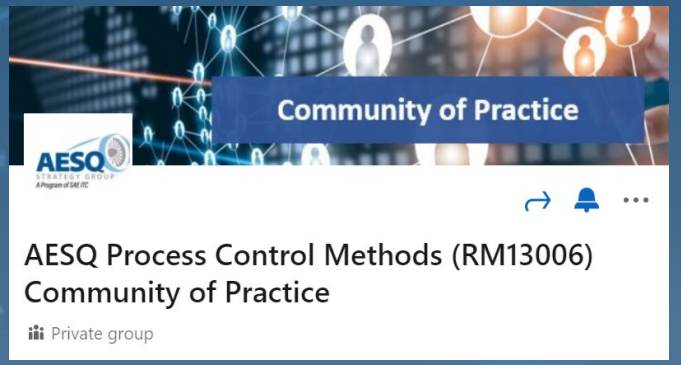
Subject Matter Interest Group – meets monthly – supports continuous improvement of RM13006 and supporting templates & tools

AESQ Process Control Methods Community of Practice (COP) on Linked-In

Current membership is 200 – let's get some more!!

https://www.linkedin.com/groups/12647920/





ONE HOUR PROCESS CONTROL ASSESSMENT

FELLOW, QUALITY ENGINEERING
PRATT AND WHITNEY

KEY POINTS

- Basic fundamentals required to be in place
- Linkage to AS13100 Chapters B & C
- Assessing a process control system does not have to take long
- Key questions to ask
- What to look for and who to talk to

ONE HOUR PROCESS CONTROL ASSESSMENT

Why this webinar?

- To provide a brief guideline used to assess a supplier's process control system in meeting AS13100 Chapter's B and C with the following goals:

  - Try not to boil the ocean; get to the point; complete it quickly

  - Understand if supplier is working to implement process control for their good or just for customer compliance

  - What to do if implementation is poor

AS13100 REQUIREMENTS HIGHLIGHTS

Chapter B APQP & PPAP

NEW

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AS9145 APQP & PPAP required to manage:

- New Product Introduction
- Product & Design Changes
- Source Changes
- Major Quality Issues

SAE INTERNATIONAL

AEROSPACE STANDARD	AS9145™	
	Issued 2016-11	
	Technically equivalent writings published in IAQG sectors.	

Aerospace Series – Requirements for Advanced Product Quality Planning and Production Part Approval Process

RATIONALE

This standard was created to define the aviation, space, and defense process requirements for Advanced Product Quality Planning (APQP) and Production Part Approval Process (PPAP). The APQP aspects of this standard define a methodology for ensuring that the product development processes deployed throughout the aviation, space, and defense industries are fully integrated phased processes that extend from concept and design through manufacturing process planning and execution, and on into product use, service, and customer feedback. The PPAP is an output of APQP confirming that the production process has demonstrated the potential to produce products that consistently fulfill all requirements at the customer demand rate.

FOREWORD

To assure customer satisfaction, the aviation, space, and defense industry organizations must produce and continually improve safe, reliable products that equal or exceed customer and regulatory authority requirements. The globalization of the industry and the resulting diversity of regional/national requirements and expectations have complicated this objective. End-product organizations face the challenge of assuring the quality of and integration of product purchased from suppliers throughout the world and at all levels within the supply chain. Industry suppliers face the challenge of delivering product to multiple customers having varying quality expectations and requirements.

The aviation, space, and defense industry established the International Aerospace Quality Group (IAQG) for the purpose of achieving significant improvements in quality, delivery, safety, and reductions in cost, throughout the value stream. This organization includes representation from companies in the Americas, Asia/Pacific, and Europe.

This document standardizes the requirements for the Product Development Process (PDP) through the use of APQP and PPAP methodologies. The establishment of common requirements, for use at all levels of the supply chain, should result in the elimination or reduction of organization unique requirements, and the resulting variation inherent in the multiple expectations.

TO PLACE A DOCUMENT ORDER: Tel: 877-606-7323 (inside USA and Canada)
Tel: +1 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: CustomerService@sae.org
SAE WEB ADDRESS: http://www.sae.org

SAE values your input. To provide feedback on this Technical Report, please visit
http://standards.sae.org/AS9145

Flow down

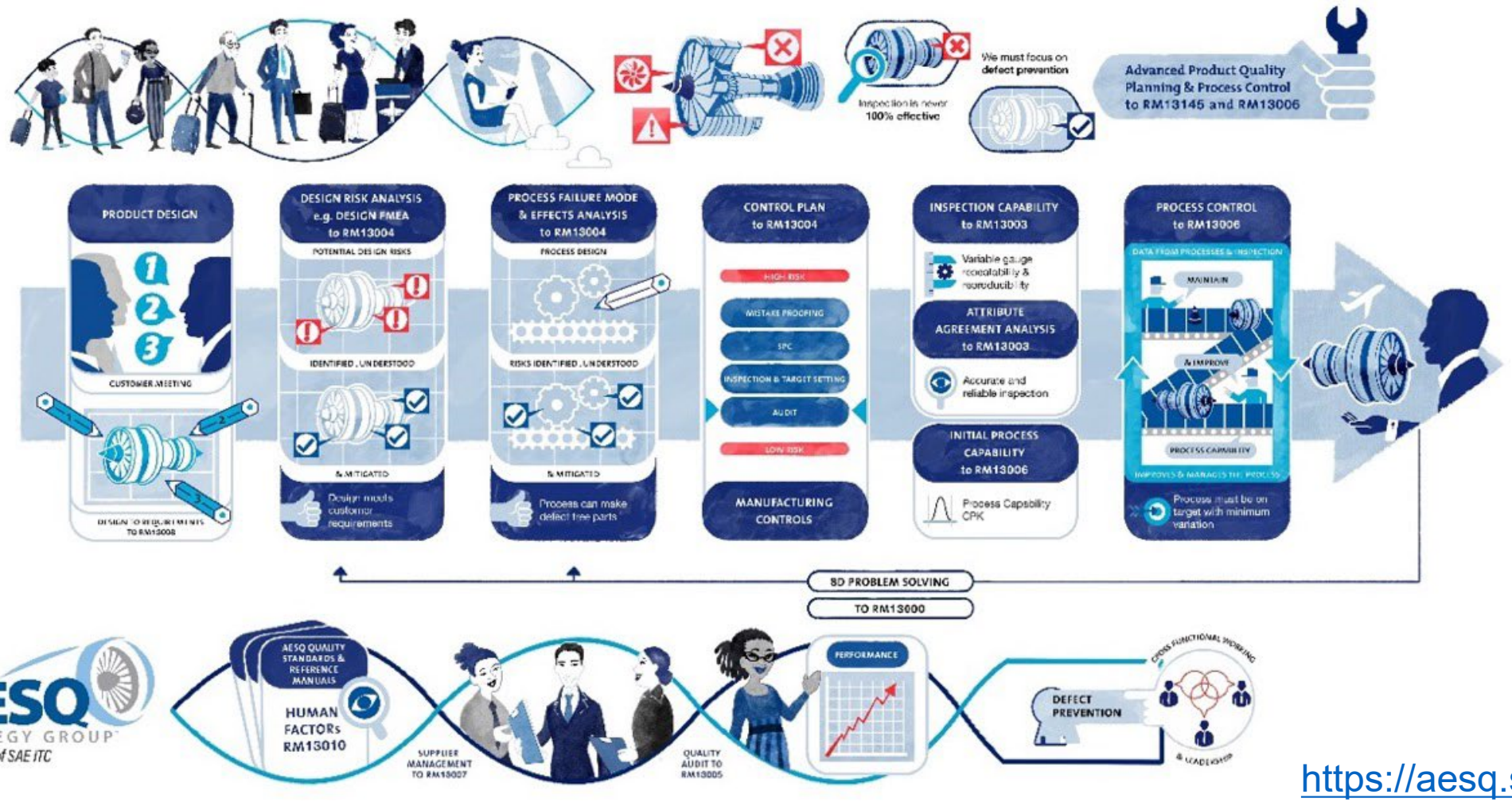
1. Look for AS13100 to be required by engine OEM spec on purchase order (e.g., PW ASQR-01, RR Sabre, GE S1000, etc.)

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

So what should we look for to see evidence of process control implementation?

Defect Prevention Key Quality Tools for Zero Defects



https://aesq.sae-itc.com/

This is good but a lot to digest. What should we look for if time is short?

AS13100 REFERENCE MANUALS

AESQ STRATEGY GROUP
A Program of SAE ITC

AS13100 Standard defines mandated requirements.

The Standard is supported by free issue Reference Manuals from the AESQ Website:

https://aesq.sae-itc.com/supplemental-material

Look for the Gold Books

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

RM13006 TRAINING SYLLABUS

Details the minimum content that a Process Control Methods training syllabus needs to contain to support continued competence in the application of this standard

Partial syllabus shown

Refer to Appendix C for the full training syllabus

Table 1 – Training Syllabus

THEME	OUTCOMES	MINIMUM CONTENT
The importance of Process Control	Appreciation of customers' needs and the benefits to the organization, industry and society Learning Objective: Learner will be able to describe the importance of process control including how it benefits company, industry, and society.	• Examples and discussion on process control failures • Reputational impact • Effect on the Aerospace industry • Benefits of achieving design nominal (Taguchi's Loss Function) • Understanding and importance of a closed loop control system • Effectiveness of in process control over end-of-line inspection
Process Control in Context of Quality Planning	Understanding of the linkages between the quality planning activities Learning Objective: Learner will be able to explain the purpose of Control Plans, what they contain, and their use in developing work instructions. Learning Objective: Learner will be able to describe how Control Plans link to Process FMEA.	• Linkage between PFMEA, Control Plans, and work instructions • Purpose and content of a Control Plan

RM13006 APPENDIX C FOCUS AREAS

- The importance of Process Control
- Process Control in context of quality planning
- Selection of Process Control Methods
- Data Collection
- Process Capability Analysis
- Basic Root Cause Analysis and Process Improvement
- Application of Control Charts
- Error-Proofing

PPAP ELEMENTS – AS9145/AS13100

The AESQ reference manuals ("Gold Books") on previous slide are designed to aid a supplier to implement the key PPAP elements shown on this slide.

Are they aware of this free material and the webinars offered by AESQ?

Table 8: APQP and PPAP Element Source Information

#	APQP and PPAP Element	Ref. Info.	#	APQP and PPAP Element	Ref. Info.
1	DESIGN RECORD and BOM	RM13008	15	PRELIMINARY CAPACITY ASSESSMENT	Appendix C
2	DESIGN RISK ANALYSIS (DFMEA)	RM13004	16	WORK STATION DOCUMENTATION	Appendix C
3	DESIGN FOR MANUFACTURE	RM13008	17	SUPPLY CHAIN RISK MANAGEMENT PLAN	Appendix C
4	PRODUCT CI and KC	RM13008	18	MSA PLAN	Appendix C
5	PRELIMIMARY SOURCING PLAN RISK ANALYSIS	Appendix C	19	PRODUCTION PROCESS RUN(S)	APQP-PPAP Flow Diagram
6	PACKAGING SPECIFICATION	RM13008	20	MSA STUDIES	RM13003
7	DESIGN VERIFICATION/VALIDATION RESULTS	RM13008	21	INITIAL PROCESS CAPABILITY STUDIES	RM13006
8	PROCESS FLOW DIAGRAM	RM13004	22	DIMENSIONAL and NON-DIMENSIONAL RESULTS	Appendix C
9	FLOOR PLAN LAYOUT	Appendix C	23	PRODUCT VALIDATION RESULTS	Appendix C
10	PACKAGING, LABELLING, ETC	Appendix C	24	INITIAL MANUFACTURING PERFORMANCE STUDIES	Appendix C
11	TEST INSPECTION PLAN (Char. Matrix)	Appendix C	25	CUSTOMER SPECIFIC REQUIREMENTS (PPAP)	Appendix C
12	PFMEA	RM13004	26	FIRST ARTICLE INSPECTION	RM13102
13	PROCESS KEY CHARACTERISTICS	Appendix C	27	PPAP SUBMISSION (Inc. Approval Form)	Appendix C
14	CONTROL PLAN (Pre-Launch/Production)	RM13004	Light blue is an item of the PPAP file and PPAP Submission (Submission Level)		

Focus of the Quick Assessment

ASSESSMENT PREPARATION

1) Pull a PPAP P/N with list of KC features defined by the Customer, self-selected by the supplier or both

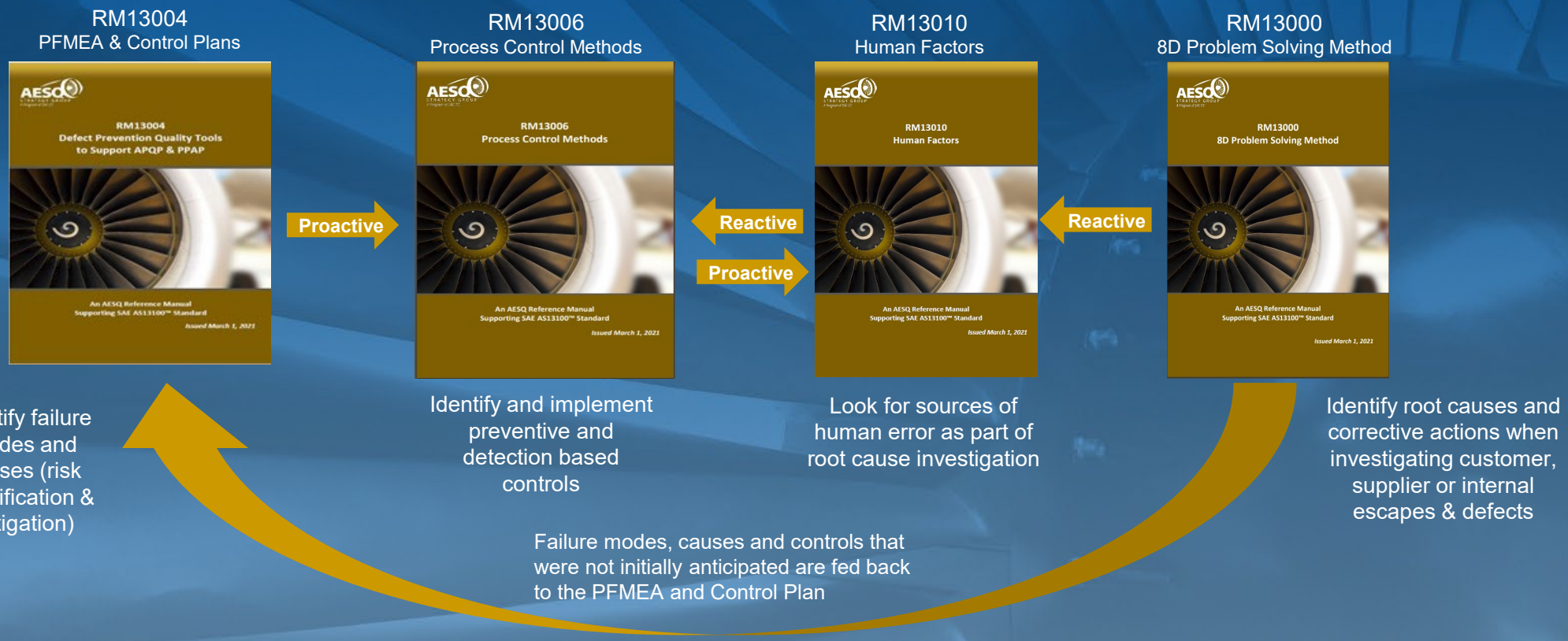
2) Have supplier pull out Process Flow Diagram, PFMEA, Control Plan and operator work instruction documents for a couple of process steps that have either Customer defined KC's and/or supplier self-selected KC's.

3) Try to schedule your visit on a day the supplier is running those parts.

4) Schedule at least one hour on the agenda for a "Process Control Quick Assessment".

THE REFERENCE MANUAL INTERACTIONS

Process Control Methods (RM13006) will interact with failure mode and cause identification (RM13004), which includes Human Factors (RM13010), and 8D Problem Solving Method (RM13000)



BOTTOM LINE – EVIDENCE TO LOOK FOR

Process Flow Diagram with KC's identified (where produced/inspected)

PFMEA with KC's accounted for

Control Plan accounting for all KC's and other high-risk areas

Gage Capability Studies for gages used to measure KC's

Use of non-statistical methods such as error proofing devices for high-risk areas

Use of Control Charts for KC's at point of manufacturing

Is a process control subject matter expert on staff (e.g., Six Sigma GB/BB or CQE)

How an operator responds to an out-of-control condition

Evidence of process control training

Use of process control data by company's engineering department

Questions and guidance on the following slides address the items here on the left

QUESTIONS TO ASK

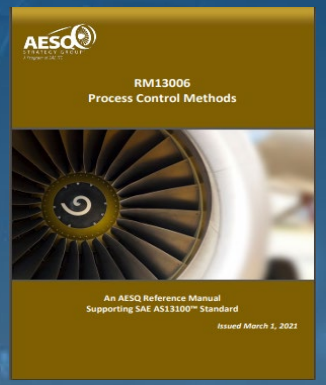
1) Is supplier familiar with RM13004 (PFMEA), RM13006 (Process Control Methods) and RM13003 (MSA)?

See if at least one person is well versed in these manuals and has a solid process control background with professional credentials such as Six Sigma Greenbelt/Blackbelt or ASQ CQE certification.

RM13004
PFMEA & Control Plans

RM13003
Measurement Systems Analysis

RM13006
Process Control Methods



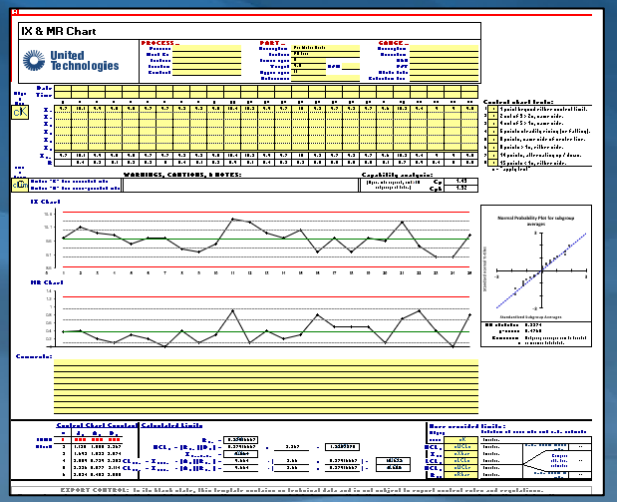
2) Are Operator's work instructions identified with KC features on them?

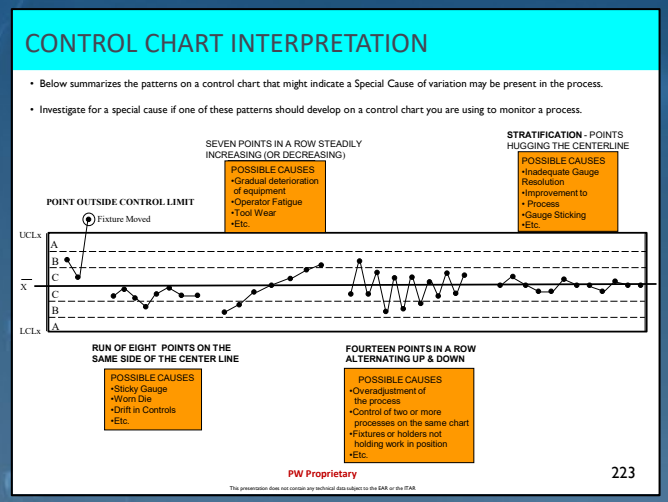
Look to see if the work instruction identifies somehow the KC KC feature and the need to apply SPC control chart data collection and monitoring.

QUESTIONS TO ASK

3) How does the operator collect the KC data? Look for a control chart and the Western Electric Rules at their workstation.

Go out to the factory to witness the data collection system looking to ensure the operator is utilizing a SPC control chart. This is very important as many just collect the data and analyze it in a software such as Minitab afterwards for PPAP submission. This nullifies the use of a control chart as a control method called out on a control plan per RM13006. It is important to see the control chart being used as a control method by the operator at the transformational process step. This is done with the Western Electric Rules that identify out-of-control patterns. If this is not happening, then you've identified a key weakness in the supplier's process control system.

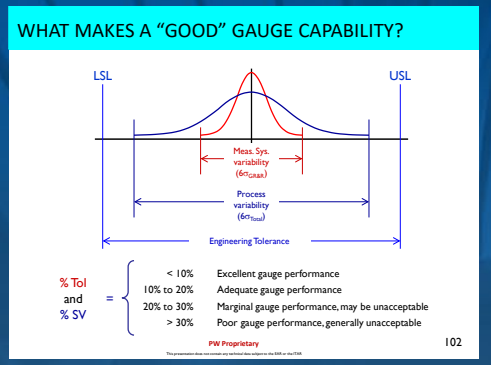




QUESTIONS TO ASK

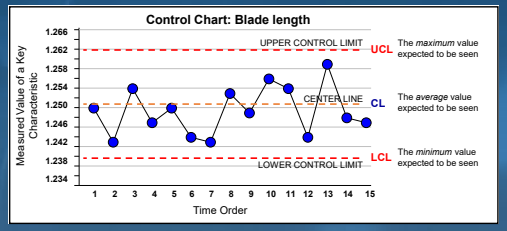
4) Has a Gage Capability Study been done?

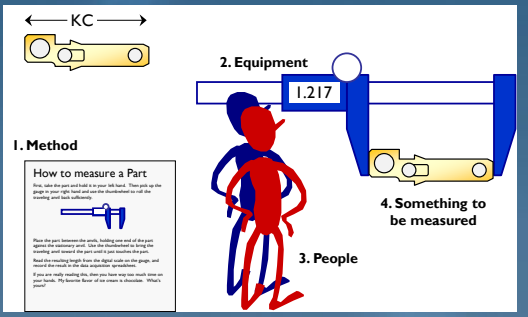
Look at the results. Examine what happens when it is over 20% of Tolerance. See if the supplier practices guard banding as a containment method per RM13003.



5) What SPC and MSA training do your operators & engineers get and who provides the training?

Inquire if there is documented, formal process control and MSA training provided to key personnel. Ask if there a process control engineer with some sort of credential (e.g., Six Sigma Greenbelt/Blackbelt, ASQ CQE) that has been trained in the curriculum suggested in RM13004/RM13006/RM1003 who provides their internal training. Determine if operators understand the Western Electric Rules for control chart signals of out-of-control and what their reaction plan is.





QUESTIONS TO ASK

6) How do you handle when Cpk < 1.0?

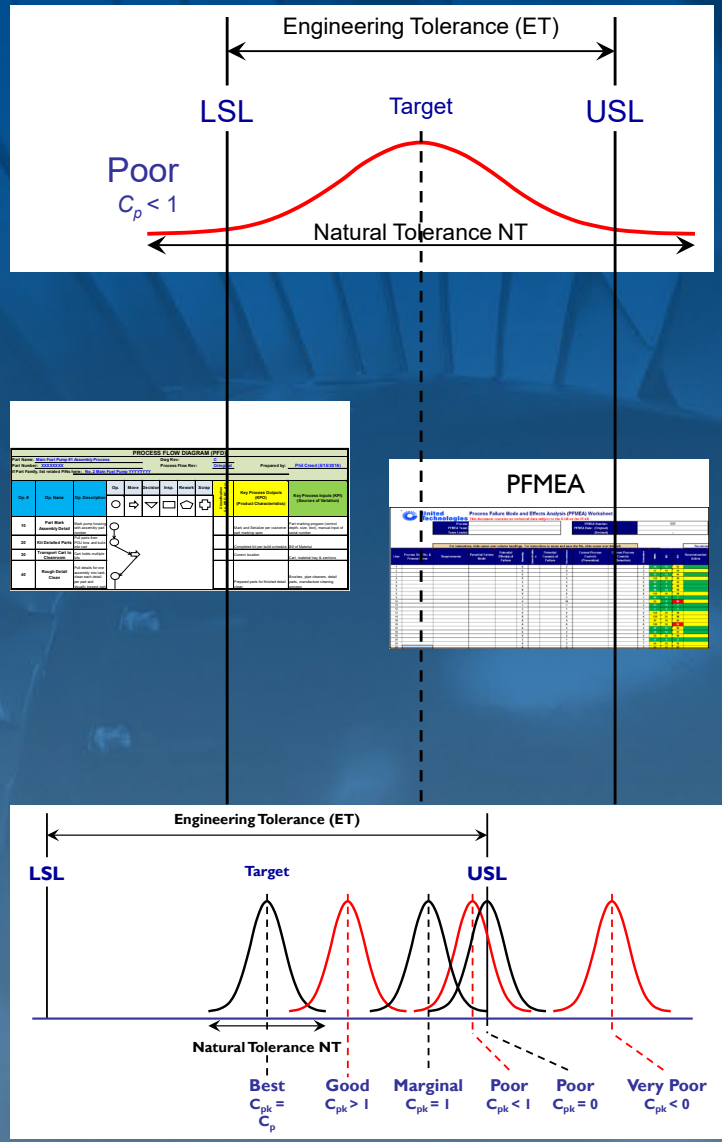
Look to see if process capability data is reviewed at a monthly Quality Improvement Meeting. If no such meeting exists, then this would be a sign that process control is for compliance purposes only. Dig into that.

7) Does the supplier self-select their own KC's based on the risks coming out of their PFMEA?

This will tell a lot about the supplier's commitment to process control and their true understanding. If they are not self-selecting their own KC's they are probably in it for compliance purposes only.

8) Does the supplier highlight processes that are incapable and what is being done about it in the factory where operators can see what you are doing with the data they collect.

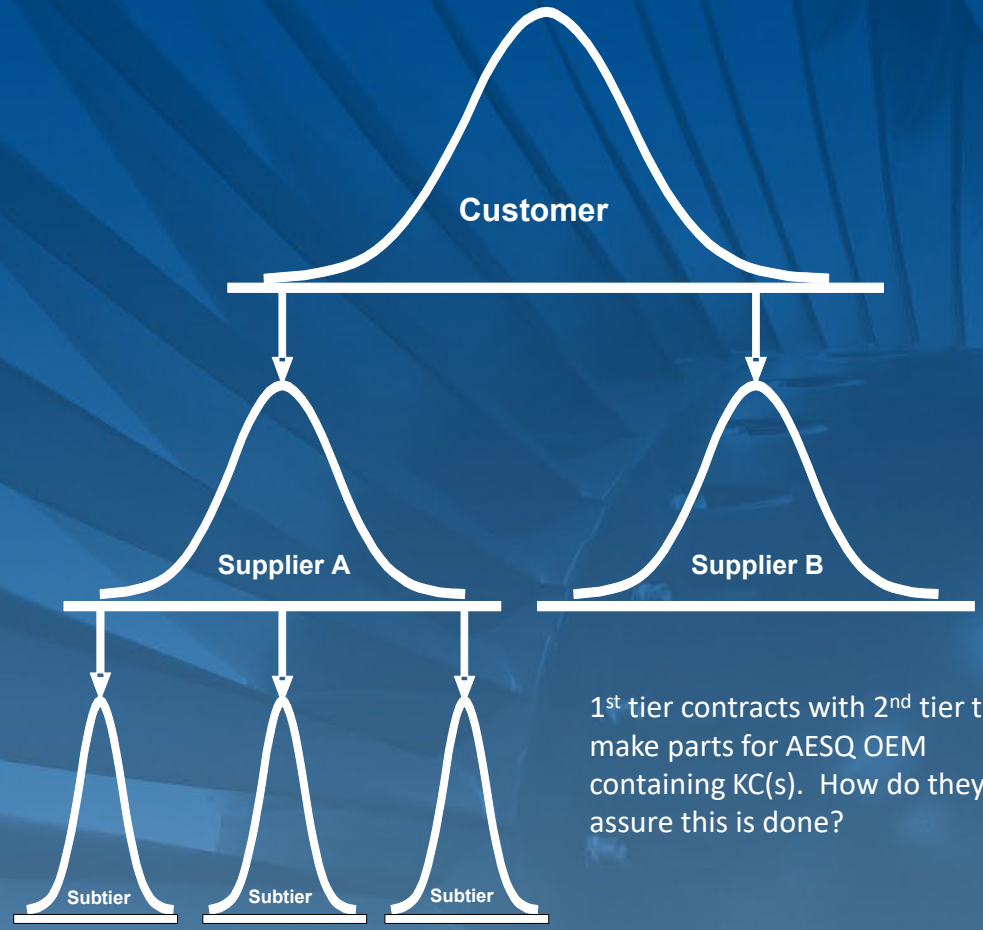
It's important the operator sees that the data collection and SPC monitoring is being used to help make process capability improvements. Look for supplier highlighting the worst three Cpk's of the month with a story about what actions are being taken. Ideal is posted in the shop.



QUESTIONS TO ASK

9) Describe how you handle (or would handle) when the Customer defined KCs are produced by a sub-tier supplier?

This situation may not be applicable at the present time. But what if that changes? And the 1st tier contracts out the part manufacturing or does a vendor assist that involves the KC transformation operation at a 2nd tier? Does the 1st tier flow down the data collection and monitoring requirements of AS13100? Do they assure control and capability of the KC by the 2nd tier?



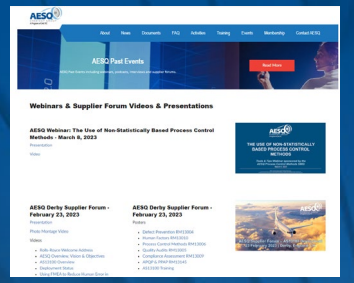
KCs are selected by Customer Engineering per their internal design process consistent with RM13004/RM13145

Supplier receives requirements from Customer on drawing P.O. or some other means of flow down. AS13100 is required.

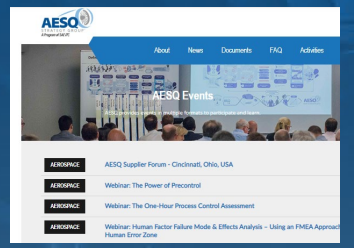
1st tier contracts with 2nd tier to make parts for AESQ OEM containing KC(s). How do they assure this is done?

FOLLOWING THE ASSESSMENT

- Point supplier to AESQ “Past Events” website for access to webinar videos and material that have already been conducted.
- Refer supplier to AESQ “Upcoming Events” website for webinars and training programs related to process control and other topics.
- Refer the supplier to the AESQ website for information on free reference manuals and templates.



Past Events
https://aesq.sae-itc.com/past-events



Upcoming Events
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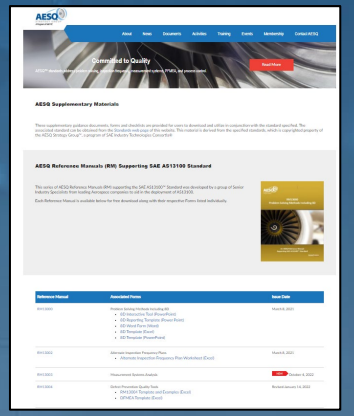
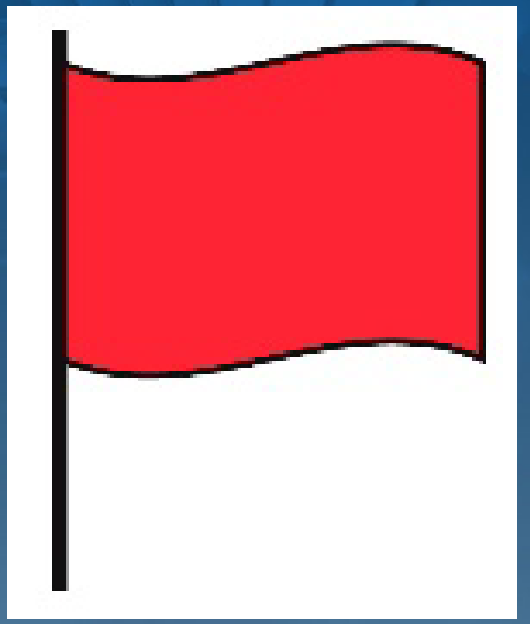


Aerospace Engine Supplier Quality Supplemental Material Page
https://aesq.saeitc.com/supplemental-material

RED FLAGS TO LOOK OUT FOR



RICARDO BANUELAS

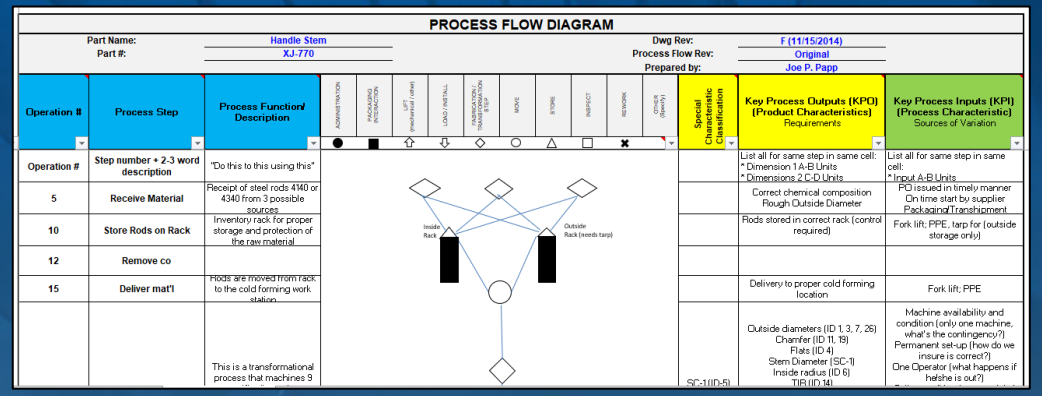
HEAD OF CONTINUOUS IMPROVEMENT AND QUALITY NORTH AMERICA- DEFENSE / LEAN SIX SIGMA MBB
ROLLS ROYCE

RED FLAGS

PROCESS FLOW DIAGRAM – RM13004

Process Flow does not link or align with job router/traveler/shop order.

Not accounting for multiple stations where process step may be performed; control system may be different depending where the process step is run.



PROCESS FLOW DIAGRAM

Part Name:	Handle Stem	Dwg Rev:	F (11/15/2014)	
Part #:	XJ-770	Process Flow Rev:	Original	
		Prepared by:	Joe P. Papp	

Operation #	Process Step	Process Function/ Description	Special Characteristic Classification	Key Process Outputs (KPO) (Product Characteristics) Requirements	Key Process Inputs (KPI) (Process Characteristic) Sources of Variation
Operation #	Step number + 2-3 word description	"Do this to this using this"		List all for same step in same cell: * Dimension 1 A-B Units * Dimensions 2 C-D Units	List all for same step in same cell: * Input A-B Units
5	Receive Material	Receipt of steel rods 4140 or 4340 from 3 possible sources		Correct chemical composition Rough Outside Diameter	PO issued in timely manner On time start by supplier Packaging/Transhipment
10	Store Rods on Rack	Inventory rack for proper storage and protection of the raw material		Rods stored in correct rack (control required)	Fork lift; PPE, tarp for (outside storage only)
12	Remove co				
15	Deliver mat'l	Rods are moved from rack to the cold forming work station		Delivery to proper cold forming location	Fork lift; PPE
		This is a transformational process that machines 9	SC-1 (ID-5)	Outside diameters (ID 1, 3, 7, 26) Chamfer (ID 11, 19) Flats (ID 4) Stem Diameter (SC-1) Inside radius (ID 6) TIR (ID 14)	Machine availability and condition (only one machine, what's the contingency?) Permanent set-up (how do we insure is correct?) One Operator (what happens if he/she is out?)

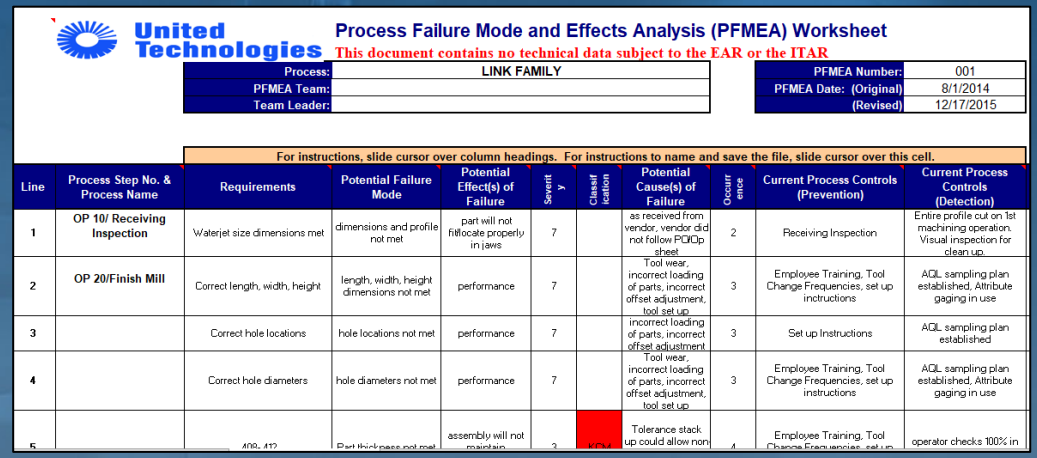
PFMEA – RM13004

PFMEA documents are dated even when changes to process plan have occurred.

Failure modes and causes are combined making it hard to determine the control strategy.

Misalignment between requirements, failure modes, causes and controls.

No Supplier self-identified KC's.



United Technologies

Process Failure Mode and Effects Analysis (PFMEA) Worksheet

This document contains no technical data subject to the EAR or the ITAR

Process:	LINK FAMILY	PFMEA Number:	001
PFMEA Team:		PFMEA Date: (Original)	8/1/2014
Team Leader:		(Revised)	12/17/2015

For instructions, slide cursor over column headings. For instructions to name and save the file, slide cursor over this cell.

Line	Process Step No. & Process Name	Requirements	Potential Failure Mode	Potential Effect(s) of Failure	Severity	Classification	Potential Cause(s) of Failure	Occurrence	Current Process Controls (Prevention)	Current Process Controls (Detection)
1	OP 10/ Receiving Inspection	Waterjet size dimensions met	dimensions and profile not met	part will not fit/locate properly in jaws	7		as received from vendor, vendor did not follow PO/Op sheet	2	Receiving Inspection	Entire profile cut on 1st machining operation. Visual inspection for clean up.
2	OP 20/Finish Mill	Correct length, width, height	length, width, height dimensions not met	performance	7		Tool wear, incorrect loading of parts, incorrect offset adjustment, tool set up	3	Employee Training, Tool Change Frequencies, set up instructions	AQL sampling plan established, Attribute gaging in use
3		Correct hole locations	hole locations not met	performance	7		incorrect loading of parts, incorrect offset adjustment	3	Set up Instructions	AQL sampling plan established
4		Correct hole diameters	hole diameters not met	performance	7		Tool wear, incorrect loading of parts, incorrect offset adjustment, tool set up	3	Employee Training, Tool Change Frequencies, set up instructions	AQL sampling plan established, Attribute gaging in use
5		.409-.412	Part thickness not met	assembly will not maintain	3	KCH	Tolerance stack up could allow non	4	Employee Training, Tool Change Frequencies, set up	operator checks 100% in

RED FLAGS

MEASUREMENT SYSTEMS ANALYSIS – RM13003

Gage Capability Study has unacceptable percent-to-tolerance ratio (> 20%) with no containment plan or corrective action plan in place (i.e., guard banding, new gage on order, calibrating operator methods).

Attribute AbA study conducted with only good parts when nonconforming parts are required in the sample used.

CONTROL PLAN – RM13004

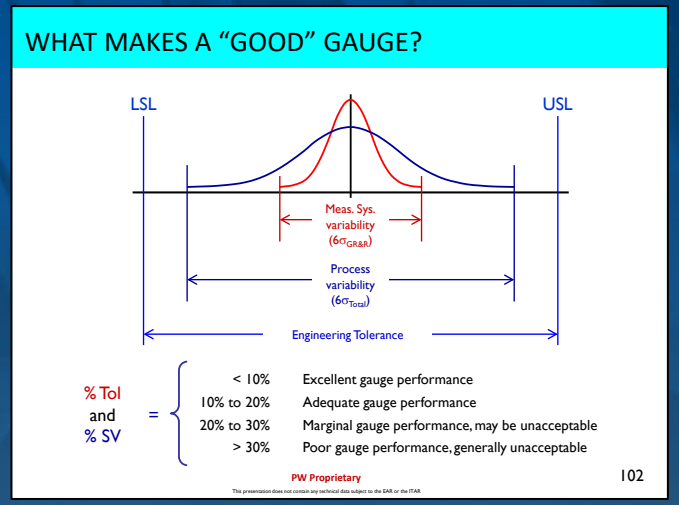
Reaction Plans geared to non-conforming/out of tolerance features only.

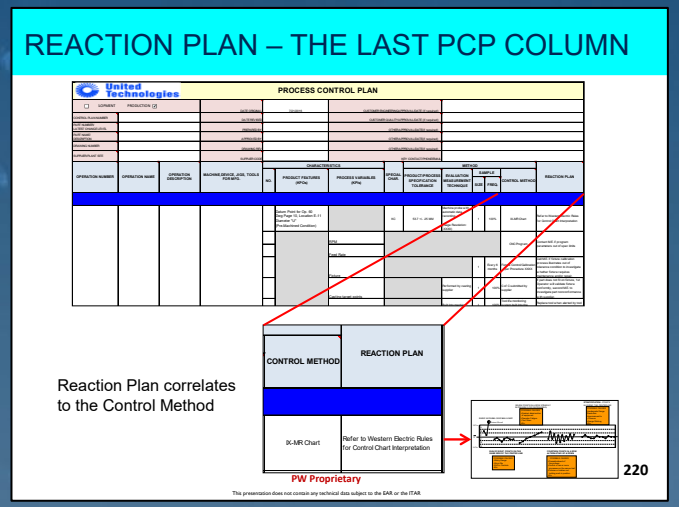
Reaction Plans do no align to the established control method or reflect RM13006.

Control Plan does not account for all high risks and/or process variation.

Control Plan does not address Customer KC's nor Suppler self-selected KC's.

Operator work instructions lack alignment with Control Plan.





RED FLAGS

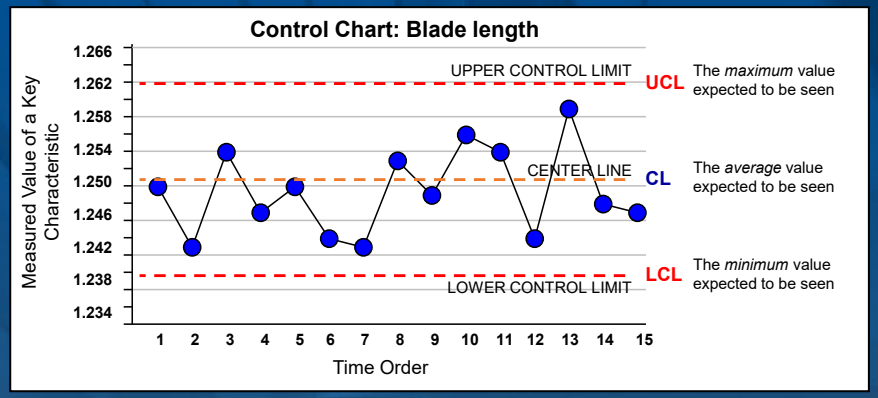
SPC CONTROL CHART AND CAPABILITY STUDIES – RM13006

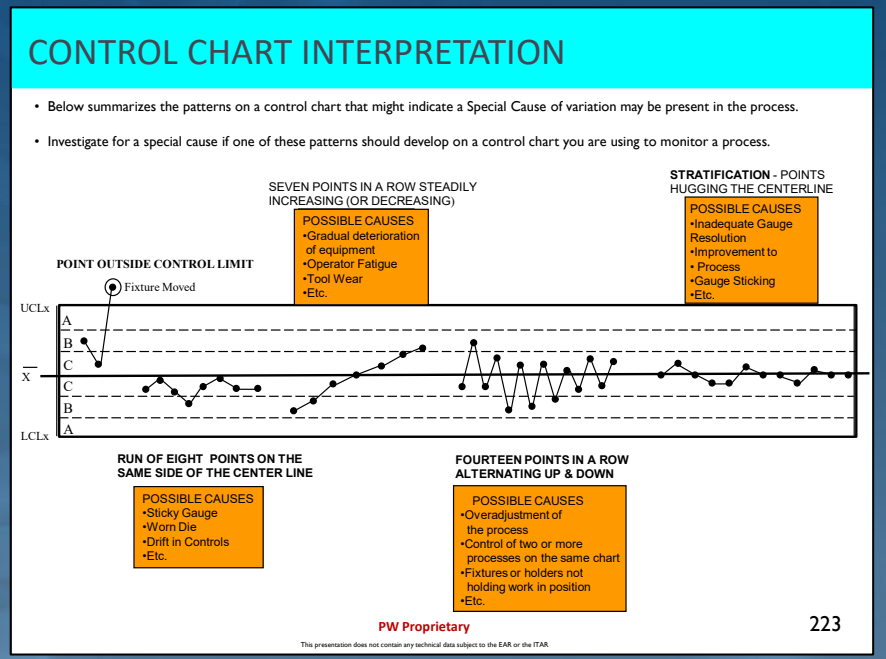
Control Charts are not in place at transformation operation

No evidence operators are trained in use of control charts or the Western Electric Rules

Data collected at transformation operation but analysis done separately for the purpose of satisfying Customer reporting or PPAP submission

General SPC resistance as described in RM13006, Section 12.3.





SUMMARY AND CLOSE

PETER E. TETI
FELLOW, QUALITY ENGINEERING
PRATT AND WHITNEY

FUTURE WEBINARS

From the Process Control Methods SMIG Group

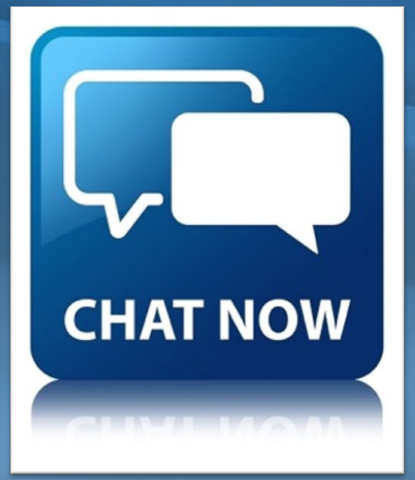
Look for these future topics in the "Upcoming Events" page on the AESQ website:

https://aesq.sae-itc.com/interest-groups

NO.	FUTURE WEBINAR TOPICS	TARGET DATE/TIME	WEBINAR LEAD	SUPPORTING SUB-TEAM	BRIEF DESCRIPTION
1	**Process Control Methods - What is RM13006? Interaction with other AESQ Reference Manuals**	12/6/2022 (11 AM US Eastern)	Pete Teti	Nicklas Godebu/Marnie Ham	Overview of RM13006 and how it interacts with other AS13100 reference manuals.
2	**What makes a good Process Capability Study?**	1/26/2023 (11 AM U.S. Eastern)	Steve Hampton	Marnie Ham/Karen Scavotto	Cpk values are only as good as what goes into the data used to calculate Cpk, such as the adequacy of the measurement system and achieving statistical control.
3	**Process Capability for Unilateral Tolerances**	2/8/2023 (11 AM U.S. Eastern)	Andrew Stout	Grant Braun Karen Scavotto Shailesh Shinde	How do we handle process capability for one-sided or unlateral tolerances including true position where Maximum Material Condition modifiers may play a role.
4	**The use of non-statistically based process control methods**	3/8/2023 (11 AM U.S. Eastern)	Paul Gorg	Pete Teti/Earl Capozzi/Rudi Braunieder/Nicklas Godebu	Process controls need not only be statistically based. Here we explore non-statistical methods such as error-proofing devices, the PreControl method, and the use of run charts with non statistical limts.
5	**The Power of Precontrol**	4/11/2023 (11 AM U.S. Eastern)	Andrew Stout	Steve Hampton/Pete	PreControl is a powerful non-statistical tool that is easy to get up and running with that can be used to qualify the set-up of a lot as well as a control for the production run.
6	**The One-Hour Process Control Assessment**	5/16/2023 (11 AM U.S. Eastern)	Pete Teti	Ricardo Banuelas	If you were visiting a supplier and only had time to carve out one hour for a process control assessment, what questions would you ask and where whom would you ask those questions to?
7	**Why is statistical control a prerequisite for process capability?**	Target 2nd Qtr (June)	Shailesh/Steve	Shailesh/Steve/Pete	Process Capability indexes without the use of SPC Control Charts are invalid. Control Charts are the method to monitor and control a process and are a key prerequisite prior to calculating Cp & Cpk.
8	**Dealing with Non-Normal Data**	Target 3rd Qtr. (September)	Karen Scavotto	Marnie Ham/Shailesh Shinde/Andrew Stout	What happens when the data coming from a process is non-normal? What can be done to accurately assess process capability? We will show you!
9	**Conducting capability studies for one-sided geometric tolerances**	Target 4th Qtr. (October)	Karen Scavotto	Marnie Ham/Shailesh Shinde/Andrew Stout	Aerospace component manufacturers the world over deal with geometric/one-sided features such as runout, flatness, etc. What rules have to change when assessing process capability?

Q & A SESSION

USE THE “CHAT” FUNCTION TO ASK A QUESTION…



SUMMARY

All resources will be available on the AESQ website within a few days.

An email will be sent to all registrants with a link.

AESQ STRATEGY GROUP™
A Program of SAE ITC

THANK YOU FOR PARTICIPATING