

IAQG 9138

Statistical Product Acceptance

(SAE AS9138, ASD-STAN prEN9138, SJAC9138)



**Planned Update
to AAQG 9013
(SAE ARP9013 series)**

9138 Summary
2018

9138 gives methods for statistical product acceptance

- Explains 9100 statistical requirements ^[1]
- Consumer protection statistics
 - Extends the AAQG 9013 (SAE ARP9013 series) focus
 - Implements “C=0” sampling
- Provides flexibility by offering multiple statistical options
- Applicable when
 - Chosen by a company or
 - Invoked via contract ^[2]

[1] *“When sampling is used as a means of **product acceptance**, the sampling plan shall be justified on the basis of **recognized statistical principles** and **appropriate for use**.”*

[2] *“The organization shall communicate **to external providers** its requirements for ... the use of **statistical techniques** for **product acceptance** and related instructions”*

-- IAQG 9100 QMS Requirements for Aviation, Space and Defense

- Statistical Product Acceptance
 - Written and tested by AAQG
 - Published by SAE as 5-volume ARP9013 series in 2005
 - 1) Base standard and definitions,
 - 2) Isolated lots,
 - 3) Lots in a series,
 - 4) Product accepted on the basis of process controls,
 - 5) Product made one unit at a time, and special cases.
- ARP9013 did not address statistical methods for
 - Quality improvement
 - Business statistics
- Provided methods “to ensure that each part conforms”
 - Quote is from U.S., Asian, and European Regulations.
- ARP9013 to be cancelled after 9138 publication

US FAA Advisory Circular 21-43:

- **“2-7. Inspection and Testing.** Section 21.137(e) requires procedures for inspections and tests used to ensure that each product and article conforms to its approved design.
 - c. Statistical Processes.**
 - (1) PAHs should document the use of statistical processes in the quality manual. Statistical processes will ensure that criteria for acceptance or rejection prevent the acceptance of nonconforming products or articles.
 - PAHs may use **SAE ARP9013**, **Statistical Product Acceptance Requirements**, which sets forth general requirements for implementing ... statistical product acceptance methods....”
- **“2-7.c.(3) Engineering** and manufacturing organizations **should participate** in the review, implementation, and maintenance of statistical quality/process control techniques used for product or article acceptance.”

PAH = “*Production Approval Holder*”

- **Upgrade from ARP9013**
 - Compressed the 5 volumes into one
 - Successes, lessons learned using ARP9013
 - Additional references and upgrades for global usage
 - Improved readability, new flowcharts, expanded tables and tools
 - Improved mathematical tools and functions
- **Materials in Supply Chain Management Handbook**
 - The SCM material contains guidance and illustrations of ways to meet 9138 requirements.
 - Easy access to:
 - Default risk values
 - Sampling Tables
 - Sample size computing algorithms

9138 Highlights



- Integration of Engineering & Production roles
- Recognizes “statistical principles” as required by 9100 QMS
- Flow charts and step-by-step guides
- A table of benchmark risk levels
- Guidance on training, technical auditing of sampling plans
- New statistical methods
 - Guidance on destructive testing
 - Methods of handling rejected lots
 - Methods for inspecting for clusters of nonconformances

- Strengthened connection to measurement standards
- Product acceptance based on process controls
 - More detailed than in ARP9013
 - The process control methods in ARP9013 were the first recognized by the US FAA as adequate for product acceptance
 - Increased clarity of use of PFMEA
 - Step-by-step guidance provided in special Appendix
- Recommendations for developing new statistical methods
- SCMH has free sampling tables, algorithms, tips, & examples

Conclusion



- This 9138 standard is the IAQG planned upgrade for SAE ARP9013 which has been recognized as a “Best Practice” by a major regulatory authority.
- More detailed training has been prepared for technical users.
- Contributing companies have included:
Rolls-Royce plc, AgustaWestland, Kazan Helicopters, MHI, Spirit AeroSystems, Boeing Commercial Airplanes, Saab, Boeing Tianjin, BAE Systems, Airbus

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