IAQG 9138
Statistical Product Acceptance
(SAE AS9138, ASD-STAN prEN9138, SJAC9138)

Planned Update to AAQG 9013
(SAE ARP9013 series)

9138 Summary
2018
Management Summary

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
What was SAE ARP9013?

- **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.”
New Features for 9138

• **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 SCMH 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
9138 Highlights (cont.)

- 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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