

ASTM Standard for Hit/Miss POD Analysis

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Agenda

- ASTM Standard
 - General Information
 - Scope & Rationale
 - Summary of Practice

- Content Specifics

- Relationship to MIL-HDBK-1823A

- Your feedback



ASTM Standard

- **Title:** Probability of Detection Analysis for Manual Inspection Hit/Miss Data
- **Standard Type:** Practice
- **ASTM Work Item:** WK29631
- **ASTM Sponsoring Subcommittee:** E07.10 Emerging Technology
- **Target Ballot Date:** 1/2011 at the E07.10 subcommittee meeting in Ft. Lauderdale, FL



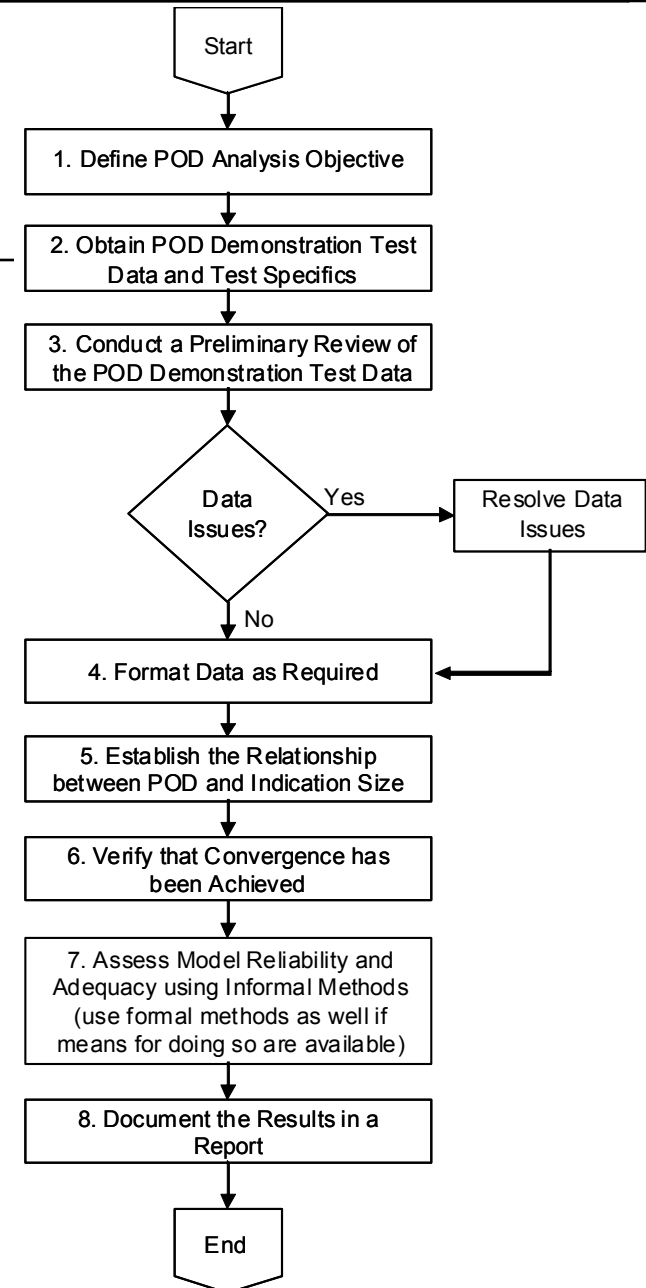
ASTM Standard

- **Scope:** This practice defines the accepted procedure for performing a statistical analysis on manual inspection hit/miss data to determine the demonstrated probability of detection (POD) for a specific set of test parameters. Topics covered include the standard hit/miss POD curve formulation, validation techniques, and correct interpretation of results.
- **Rationale:** Currently there is no specification that addresses this subject. The Air Force has released a Handbook with guidelines on how to fabricate POD specimens and conduct/analyze POD studies using mh1823 POD software. The Handbook is not a requirements document and does not describe the general procedure for analyzing manual inspection hit/miss data and verifying the results for correctness regardless of the software being used to perform the analysis.

ASTM Standard

□ Summary of Practice

- This practice describes step-by-step the process for analyzing manual inspection hit/miss POD demonstration test data, including minimum requirements for validating the resulting POD curve.
- This practice also includes definitions and discussions for results of interest (e.g., a90/95) to ensure correct interpretation of results.





Content Specifics

- **Specific information about the POD demonstration test shall be obtained.**
 - Specimen geometry, material, test date, number of inspectors, type of inspection method, any comments from the inspector(s) and test administrator

- **A logistic regression model shall be used to model the relationship between POD and flaw size for manual NDE systems that produce a binary response for a known range of flaw sizes.**

- **Convergence shall be verified.**

- **Informal model diagnostic methods shall be used at a minimum.**
 - Check number of iterations to achieve convergence
 - Visually assess POD curve shape and how well it models the data
 - Visually assess the shape of the confidence bound
 - Effect of outlying data points should be assessed.



Content Specifics

- A note on **other POD methods** is included in the Appendix:
 - Other methods exist for determining the demonstrated POD for manual inspection hit/miss data. However, caution should be used with methods that yield only a point estimate and not an entire POD curve. With these methods it is not possible to assess the affect that size has on POD.



Relationship to MIL-HDBK-1823A

- Guidelines in MIL-HDBK-1823A are the cornerstone of this ASTM Standard
- MIL-HDBK-1823A is referenced in the Standard
- Hit/Miss analysis will become an industry standard practice for relating POD to flaw size
- The ASTM standard is focused on the step-by-step execution of a Hit/Miss POD analysis



Your Feedback

- Comments
- Suggestions
- Concerns
- Questions