
FAA Workshop on Key Characteristics for Composite Material Control

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General Spec Comments

- Development of Material and Process Controls prior to any qualification program to determine robustness of a given material system and process is essential.
- Majority of DOE's focus on mixture studies and not resultant process variables.
- Cost barriers prevent sequential DOE's during product development/introduction and are only performed as a result of production issues.

General Spec Comments

- Qualification process for both industry and end-user specifications must use same criteria for establishment of spec limits, material equivalence and allowables.
- Specification limits, equivalency limits and allowables using procedures in DOT/FAA/AR-0047 and MIL-HDBK-17
- Need material equivalency limits in end-user specs.

Prepreg Fabric Spec Comments

- Batch Definitions-The quantity of material must have minimal variation in properties throughout to be considered a unique batch. This statement applies to all batch definitions.
- Fibers-Line Qualifications are missing.
- Fabrics-Weaver qualification process is missing as multiple weavers are qualified and used for fabric prepregs using same style of fabric material.

Prepreg Fabric Spec Comments

- Solvent Impregnation-Robustness less than Hot-Melt impregnation due to chemical advancement during impregnation process.
- Blending of hot-melt batches in fabric impregnation is not allowed and require same lots of raws.
- Solvent impregnation-Blending of up to 5 resin lots proposed with no restrictions on raws. What is rationale? Product inconsistency!

Prepreg Fabric Spec Comments

- Fabric Requirements in Table 2A-Alignment and waviness is not usually measured until the prepreg is produced.
- Add Sizing percent due to use of DI water as a process aid in carbon fabric weaving.
- Prepregs manufacturers want desized FAW not dry FAW. FAW controls fiber loading and CPT.

Prepreg Fabric Spec Comments

- Batch testing frequency of 500# needs to be increased due to improved product consistency versus prepreg tape materials.
- Testing at the start and end of each prepreg fabric roll for physical property requirements in Table 3 is redundant.
- CPT required for equivalency baseline database to ensure same part thickness and reduce mfg. costs

Prepreg Fabric Spec Comments

- Rationale and linkage for equivalency baseline sampling plans to certification testing is missing. Why are the test plans for equivalency data development higher than normal certification testing?
- Changes to qualified materials need interchangeability criteria as true material equivalency is not obtained in practice.
- Baseline process needs to address cool-down rates.

General Spec Comments

- Compression After Impact(CAI) testing needs to include BVID level testing to evaluate any changes in BVID as a result of changes to a material system or fabricator.

Liquid Molded Materials Comments

- All constituent materials used in the LRM process must be controlled and have end-user shelf-life and storage life validated prior to qualification.
- This includes dry fabric preforms, fabric sizing/finish, tackifiers, binders, and liquid resin components, etc. that impact LRM processability.
- Baseline process definition critical to success. Sequential DOE's are needed to develop a robust process.

Liquid Molded Materials Comments

- Development of little y's (process variants) through process mapping is critical to ensure stability of big Y's (final part). You must reduce the noise level to see the process interactions.
- Most often the little y's (items currently not measured or controlled) impact the big Y's. You need lots of little y's to ensure repeatability of your process.