ZODIAC AEROSPACE

Approved Materials Task group

IAMFTWG Atlantic City, NJ

October 28, 2014

MASTERING THE ELEMENTS

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Task Group Background

- The ICCAIA (International Coordinating Council of Aerospace Industries Associations) made a request that FAA create an industry task group to formulate a process to develop an approved materials list.

Industry Interest

- 38 meeting attendees at 2013 Triennial
- 22 companies/organizations represented

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What is an Approved Materials List?

- **A database of qualified raw materials/constructions that have been certified to FAA flammability requirements**
  - Bunsen Burner
  - Heat Release
  - Smoke
  - Radiant Panel

Material selection from this database would require no further flammability testing

Discussions Over the Last 3 Meetings

Brainstorming session was held resulting in the following topics:

- How do we qualify materials?
- Is there a way to frame materials into generic groups of materials?
- Which test labs can qualify?
- Does the qualification process require a plan, project number, official conformity and regulatory witnessing?

Discussions Over the Last 3 Meetings

Brainstorming session was held resulting in the following topics:

- Database
  - Consider model similar to UL, ASTM or the fire extinguisher Halon replacement process.
  - Database to show compliance level of material (F1, F2, etc.)
  - Ongoing database administration, maintenance and costs covered by who?

Discussions Over the Last 3 Meetings

Brainstorming session was held resulting in the following topics:

- Could companies with data be able to list data for a user fee? (decorated panels, etc…)
- Need to define the key characteristics to set a foundation.
- Start in phases looking first at monolithic materials and work toward more complicated panel buildups.
- Propose the final product via AC.
- Other incentives for companies with large databases to participate?

Recent Discussion Topic:
What Conditions Require Flammability Recertification?

- **UL 746A Example**

Table 9.1
Test considerations based upon compound variations

Table 9.1 revised July 11, 2014

Additive	Addition		Deletion		Replacement[5]		Change in Level[6]		
	(absolute %)	Table 9.2	(absolute %)	Table 9.2	(absolute %)	Table 9.2	(absolute %)	(normalized %)	Table 9.2
Acid Acceptor (Scavenger)	≤2	A	≤2	A	≤1	A	–	≤30	A
	>2 but ≤5	BE	>2 but ≤5	BE	>1 but ≤5	BE	≤5	>30	BE
	>5	BDE	>5	BDE	>5	BDE	>5	>30	BDE
Antimicrobial	Any	CD	Any	CD	Any	CD	–	≤30	B
								>30	CD
Copolymer[1][4]	Any	CD	Any	CD	Any	CD	–	≤30	B
								>30	CD
Crosslinking Agent	Any	CD	Any	CD	Any	CD	–	≤30	B
								>30	CD
Curing Agent	Any	CD	Any	CD	Any	CD	–	≤30	B
								>30	CD
Flame Retardant	Any	CD	Any	CD	Any	CD	–	≤30	B
								>30	CD
Polymer Blend[1][4]	Any	CD	Any	CD	Any	CD	–	≤30	B
								>30	CD

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- **UL 746A Example**

Molecular Weight	Variations that result in a change in level of branching and/or cross-linking. See AD. Variations that do not result in a change in the level of branching and/or cross-linking. See A.

Footnotes

(1) Normalized percentage of the minor component level.

(2) All use of Blowing Agents that reduce the original density by more than 5% require the test program according to Program Codes C and D in 9.2.

(3) Program Code A applies if the original level of the additive is ≤5% Absolute.

(4) In case of a range of materials, the materials with the maximum and minimum amount of basic polymeric material have to be tested for the required properties. In case of LTTA, a 4 PT LTTA is required for the material with the maximum amount of basic polymeric material. The material with the minimum amount of material can than be evaluated using a 2 PT LTTA program.

(5) Formulation Variations are considered to be replacements only in case the identification test on the new material result in ID's [(Infrared Analysis (IR), and Differential Scanning Calorimetry (DSC), Thermogravimetric Analysis (TGA)] different from those of the original material.

(6) A change in level is to be considered in relation to an absolute and normalized level as indicated. For example, in the case of an Acid Acceptor (Scavenger) if the normalized change is >30%, the decision to proceed with test program BE or BDE per Table 9.2 depends on the absolute change, whether it is ≤5% or >5% respectively.

Recent Discussion Topic:
What Conditions Require Flammability Recertification?

- **UL 746A Example**

Program Code from Table 9.1	Test Program[1]
O	No testing necessary
A	Flame, minimum thickness at all flame ratings assigned to the original material formulation *Exception: HB flammability testing of polymer variations is not required if the burning rate of each previously tested thickness of the original formulation does not exceed 80% of the HB burning rate limits indicated in UL 94, the Standard for Tests for Flammability of Plastic Materials for Parts in Devices and Appliances.*
B	All the testing required in Program Code A, plus: UL 746A: HWI – Hot Wire Ignition UL 746A: CTI – Comparative Tracking Index UL 746A: HDT – Heat Deflection Temp. or VT – Vicat Temp. or BP – Ball Pressure Temp (thermoplastics only)

Today's Task Group Meeting Focus

- Working Model and Feasibility for Monolithic Materials
- Task Group Assignments
- Discuss Need for Online Collaboration Site
- Develop Go-No Go Workflow

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APPROVED PRODUCT LIST: ONE RESIN, SIMPLEST SCENARIO

- Gauge range: 1.0 – 6.0 mm
- Color range: All
- Tests: Bunsen Burner only

Product	Color	Thickness	BB Test
AMAZIUM 101 Resin	All	1.0 mm – 6.0 mm	"Applicable" Bunsen Burner Test @ 1.0 mm in one color per color grouping

One Test Per Color Grouping

APPROVED PRODUCT LIST: ONE RESIN, 3 TEST TYPES

- Gauge range: 1.0 – 6.0 mm
- Color range: All
- Tests: Bunsen Burner, Smoke Density, OSU

Product	Color	Thickness	BB Tests	Smoke Density Tests*	OSU Tests**
AMAZIUM 101 Resin	All	1.0 mm – 6.0 mm	"Applicable" Bunsen Burner Test @ 1.0 mm in one color per color grouping	1.0 mm in one color per color grouping	1.0 mm in one color per color grouping
				1.5 mm in one color per color grouping	1.5 mm in one color per color grouping
				2.5 mm in one color per color grouping	2.5 mm in one color per color grouping
				6.0 mm in one color per color grouping	6.0 mm in one color per color grouping

* - provided specific optical density Ds is no more than 180
** - provided the peak and total heat release measurement are 55 KW/m2 and 55 KW-min/m2 or less, respectively

Nine Tests Total Per Color Grouping

The Road Looking Ahead