5/12/2013

Dipesh Patel

Technical Manager
E-Leather




E-LEATHER®

Aviation Seating

OBJECTIVE:
Engineering consistent flame retardant properties
in aviation seat upholstery materials to eliminate program risks

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Aviation Seating

KEY CRITERIA:

WEIGHT

DURABILITY

HYGIENE

COMFORT

CERTIFICATION

VISUAL APPEAL

COST (ACQUISITION/LIFETIME)

MAINTENANCE

FEATURES

E-LEATHER®

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POPULAR UPHOLSTERY OPTIONS:

- Traditional leather
- Fabric
- Faux leather

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What is E-Leather ®

- Engineered to meet specific test requirements
- Eco friendly manufacturing process
- Lighter weight
- Controlled strength and stretch
- Higher cutting yields
- More hygienic
- Increased durability

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E-Leather ®– patented process with clean tech manufacturing

1. Leather wet blue is prepared

2. Precise milling to separate fibres

3. Fibres spread to form a sheet

E-LEATHER®

E-Leather ®– patented process with clean tech manufacturing

4. High pressure water jets entangle the fibres

5. Coatings provide finish and durability

6. In House laboratory accredited to leather and material industry standards

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Core Material

Leather Content

CERTIFICATION

Flame retardant

Coating System

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E-Leather ® – consistent properties (1)

Core Material

- Woven to E-Leather unique specification
- Specifically engineered for strength and integrity of E-Leather
- Fire retardant properties which make it ideal for meeting flammability requirements

E-Leather ® – consistent properties (2)

Leather Content

- Leather has a large variability and contributes a large percentage to the flammability performance

- Incoming wet blue (leather) is treated so that each fibre is physically the same taking out the variability

- The moisture content of the leather is controlled enabling control of the following process
  - -Impregnation Mix
  - -Flame Retardant
  - -Thickness
  - -Weight

E-Leather ® – consistent properties (3)

Flame Retardant - Treatment

- Custom designed flame retardant which compliments the E-Leather substrate and works by extinguishing flames as well as low smoke generation

- Flame retardant applied with a proprietary process
  -Consistent and repeatable application method
  -Laydown of flame retardant pre-determined for consistent flammability performance

E-Leather ® – consistent properties (4)

Coating System

- Coating system plays a large part in the flammability of the product
- Polymer chosen particularly to inhibit low heat generation and hence low burn characteristics
- Coating system has been tested to ensure colour / grain choice does not effect certification

E-Leather® SL3UL for aviation seat upholstery

- Meets FAR 25.853(a) App F Part I – 12s VB
- Meets FAR 25.853(c) App F Part II – Kerosene Burn Test*
- Meets Airbus ABD0031 – Smoke and toxic gas emissions
- Meets Boeing – BSS 7238 Smoke density
- Meets Boeing – BSS 7239 Toxicity Testing

Remark *: test done on full seat cushion construction

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12 sec VB Test Results

Meets FAR 25.853(a) App F Part I – 12s VB

- No difference whether you test in the warp or weft direction
- Colour does not cause any issue
- Grain has no effect on performance
- Results generated over 500 different batches with all test results externally validated (AIM Cambridge, UK)

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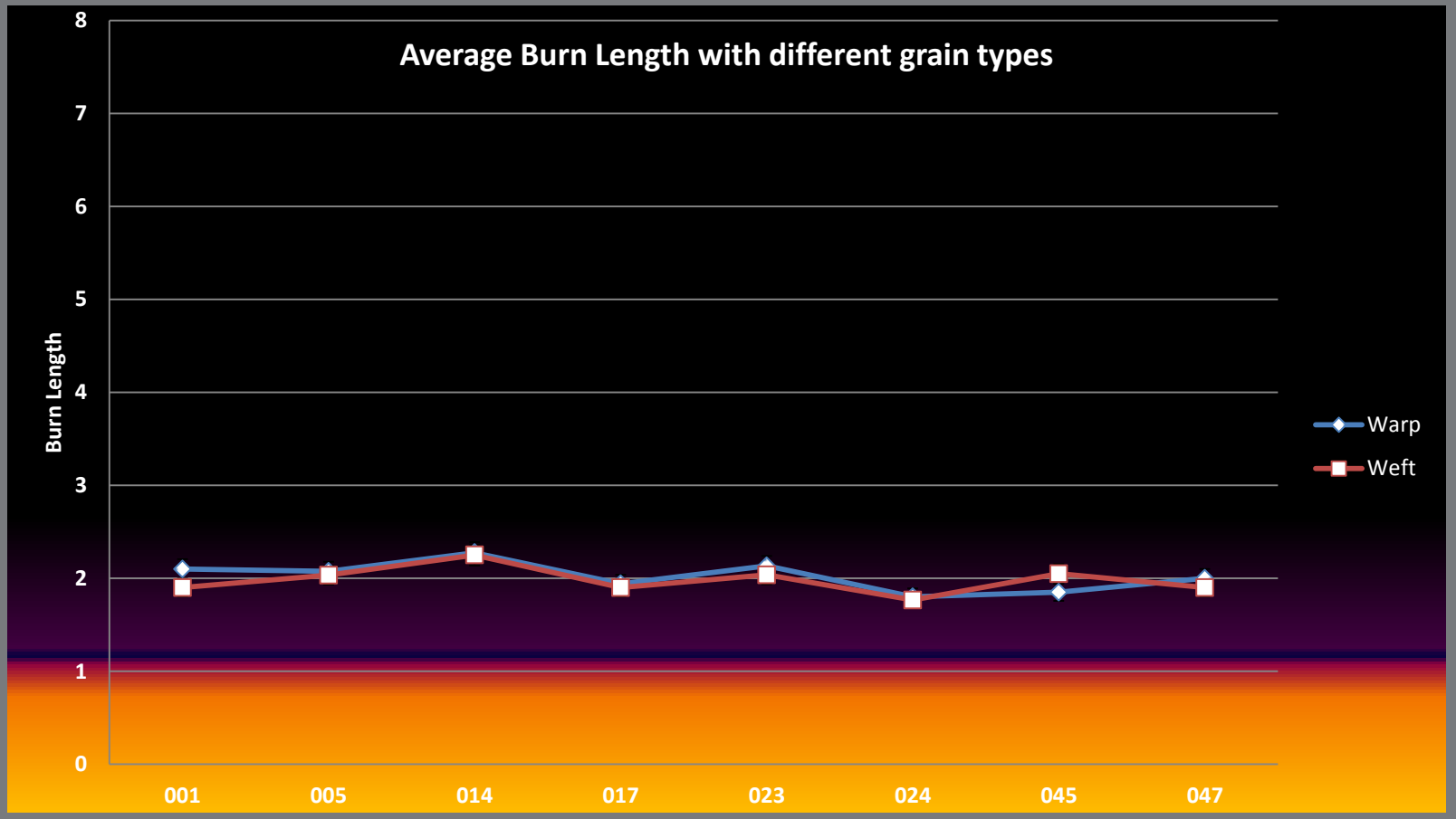
12 sec VB results for different grains



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12 sec VB results for different colours

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E-Leather® by Similarity on the SL3 range

- FAA Policy Statement dated Feb 1, 2013 Policy No: PS-AnM-25.853-01-R1

Ref No:	Feature/ construction	25.853(a) Bunsen burner test	25.853(d) Heat release and smoke test
13	Synthetic Leather/suede	E-Leather group products Testing one colour substantiates all other colours because all values have significant margin to pass criteria for 12 second vertical test	Testing each colour is required

- => Similarity on 25.853 (a)

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Smoke & Toxicity

- **Meets Airbus ABD0031 – smoke and toxic gas emissions**

  Consistent smoke emission results (ABD0031 Iss F)
  - Flaming
  - Non-Flaming

  Minimal toxic gas emissions (ABD0031 Iss F)

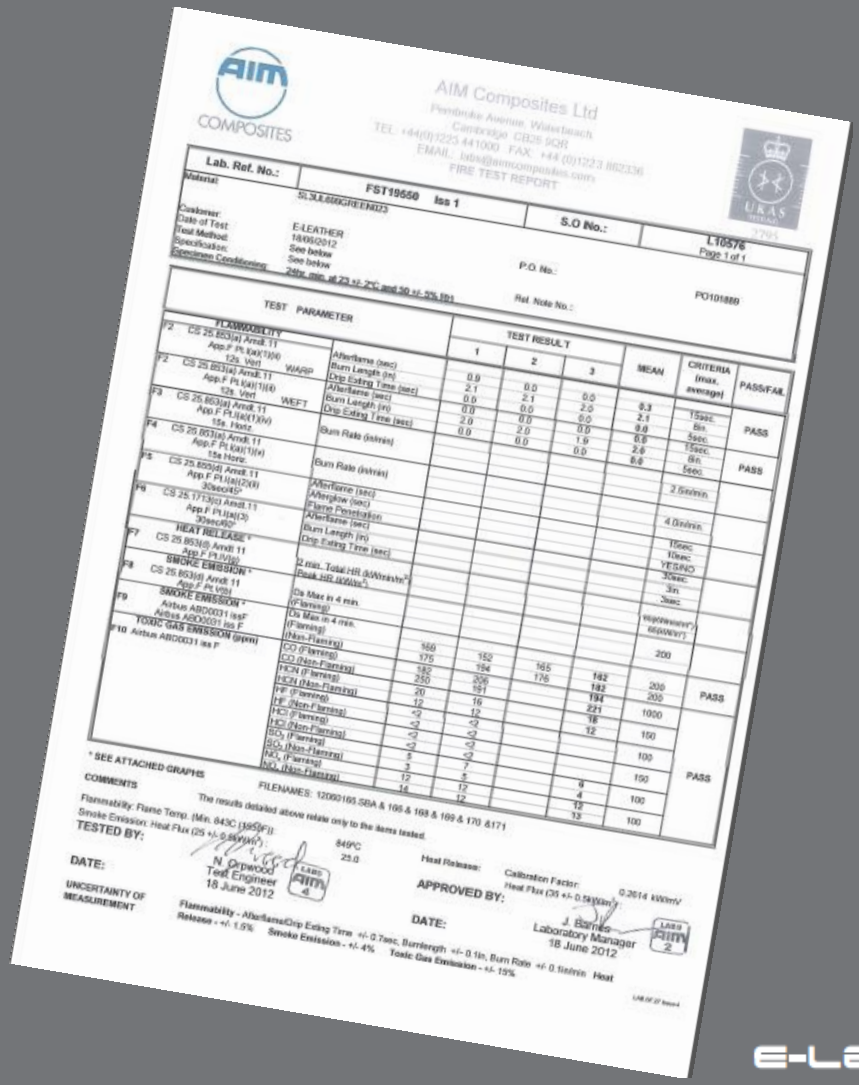
- **Meets Boeing – BSS 7238 Smoke density**

- **Meets Boeing – BSS 7239 Toxicity testing**

External Batch Certificate

Typical Test Results:-

- Flaming -150 to 160Ds
- Non-Flaming -170 to 180Ds



AIM COMPOSITES

AIM Composites Ltd
Pembroke Avenue, Waterbeach
Cambridge CB25 9QR
TEL: +44(0)1223 441000 FAX: +44 (0)1223 862336
EMAIL: labs@aimcomposites.com
FIRE TEST REPORT

UKAS TESTING 0795

Lab. Ref. No.:	FST19550 Iss 1	S.O No.:	L10576 Page 1 of 1
Material:	SILVER GREY LEATHER		
Customer:	E-LEATHER	P.O. No.:	PO101880
Date of Test:	18/06/2012		
Test Method:	See below		
Specification:	See below	Ref. Note No.:	
Specimen Conditioning:	24hr. min. at 23 +/- 2°C and 50 +/- 5% RH		

TEST PARAMETER		TEST RESULT 1	2	3	MEAN	CRITERIA (max. average)	PASS/FAIL
FLAMMABILITY							
F2 CS 25.853(a) Amdt 11 App.F Pt.I(a)(1)(ii) 12s. Vert WARP	Afterflame (sec)	0.0	0.0	0.0	0.3	15sec.	PASS
	Burn Length (in)	2.1	2.1	2.0	2.1	8in.	
	Drip Exting Time (sec)	0.0	0.0	0.0	0.0	5sec.	
F2 CS 25.853(a) Amdt 11 App.F Pt I(a)(1)(ii) 12s. Vert WEFT	Afterflame (sec)	0.0	0.0	0.0	0.0	15sec.	PASS
	Burn Length (in)	2.0	2.0	1.9	2.0	8in.	
	Drip Exting Time (sec)	0.0	0.0	0.0	0.0	5sec.	
F3 CS 25.853(a) Amdt 11 App.F Pt I(a)(1)(iv) 15s. Horiz	Burn Rate (in/min)					2.5in/min.	
F4 CS 25.853(a) Amdt 11 App.F Pt I(a)(1)(iv) 15s Horiz.	Burn Rate (in/min)					4.0in/min.	
F5 CS 25.855(d) Amdt 11 App.F Pt I(a)(2)(ii) 30sec/45°	Afterflame (sec)					15sec	
	Afterglow (sec)					10sec	
	Flame Penetration					YES/NO	
F6 CS 25.1713(c) Amdt 11 App.F Pt I(a)(3) 30sec/60°	Afterflame (sec)					30sec	
	Burn Length (in)					3in.	
	Drip Exting Time (sec)					3sec.	
HEAT RELEASE *							
F7 CS 25.853(d) Amdt 11 App.F Pt.IV(b)	2 min. Total HR (kW/min/m²)					requirement dispensed	
SMOKE EMISSION *	Peak HR (kW/m²)						
F8 CS 25.853(d) Amdt 11 App.F Pt.V(b)	Ds Max in 4 min. (Flaming)					200	
SMOKE EMISSION *	Ds Max in 4 min. (Flaming)						
F9 Airbus ABD0031 iss F Airbus ABD0031 iss F	(Non-Flaming)						
TOXIC GAS EMISSION (ppm)	CO (Flaming)	168	152	165	162	200	PASS
F10 Airbus ABD0031 iss F	CO (Non-Flaming)	175	194	176	182	200	
	HCN (Flaming)	182	206		194	200	
	HCN (Non-Flaming)	200	181		191		
	HF (Flaming)	20	16		18	1000	
	HF (Non-Flaming)	12	12		12		
	HCl (Flaming)	<2	<2			150	
	HCl (Non-Flaming)	<3	<3				
	SO2 (Flaming)	<3	<3			100	
	SO2 (Non-Flaming)	<2	<2				
	NO$_x$ (Flaming)	5	<2			150	
	NO$_x$ (Non-Flaming)	7	7				
		17	5		6	100	
		14	12		4		
			12		13	100	

* SEE ATTACHED GRAPHS

FILENAMES: 12000165.SBA & 166 & 168 & 169 & 170 &171

COMMENTS: The results detailed above relate only to the items tested.

Flammability: Flame Temp. (Min. 843C (1550F)): 849°C
Smoke Emission: Heat Flux (25 +/- 0.5kW/m²): 25.0 Heat Release: Calibration Factor: Heat Flux (35 +/- 0.5kW/m²) 0.2614 kW/mV

TESTED BY: N. Orchwood, Test Engineer, 18 June 2012

APPROVED BY: J. Barnes, Laboratory Manager, 18 June 2012

DATE:

UNCERTAINTY OF MEASUREMENT: Flammability - Afterflame/Drip Exting Time +/- 0.7sec, Burnlength +/- 0.1in, Burn Rate +/- 0.1in/min. Heat Release - +/- 1.5% Smoke Emission - +/- 4% Toxic Gas Emission - +/- 15%

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Kerosene Burn Test

- Meet FAR 25.853(c) App F Part II – Kerosene Burn Test
- E-Leather has the versatility to pass testing on a variety of seat cushion constructions
- Core material as well as flame retardant hold the integrity of the seat cushion in place acting as a firebarrier
- Consistent burn length and weight loss percentage results minimise certification risk

Kerosene Burn Typical Test results

Colour	Dark Blue	Brown	Blue
E-Leather Type	SL3UL	SL3UL	SL3UL
Grain	017	023	023
Liner / Scrim Covering	N/A	10oz Cotton Duck	PE FR Scrim
Fire Blocker	7725R	None	None
Base Foam 1	80% RS65 Foam	FP600 100%	5mm MP55 Foam
Base Foam 2	20% Fireseal FO36 10mm		
Back Foam 1	80% RS65 Foam	FP600 100%	5mm MP55 Foam
Back Foam 2	20% Fireseal FO36 10mm		
Cushion Weight Grams	4710, 4700, 4745	7578, 7668, 7620	3487, 3510, 3505
Weight Losses %	2.7, 2.7, 2.6	4.33, 4.47, 4.84	6.3, 5.2, 4.8
Average Weight Loss %	2.6	4.55	5.4
Horizontal Top Burn cm	10.5	8	6.5
Horizontal Bottom Burn	7.5	8	7
Vertical Face Burn	7.5	7.5	7.5
Vertical Under Burn	0, 0, 0	1.7	0, 0, 0

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Conclusions

- Textile materials, due to their inherent consistency have been granted similarity as long as specified weight criteria and 12sec vertical burn tests are within specified limits.

- Traditional leather, has never been allowed this similarity due to inherent variability within a hide, and from hide to hide, due to the life experience of the animal. Therefore the fire performance is variable and requires testing to confirm compliance.

- E-Leather is a man-made engineered product with very consistent properties and following a formal submission to EASA similarity status has been granted to the E-Leather product.

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ANY QUESTIONS?

www.eleathergroup.com




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