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FIRE CHARACTERISATION TEST REPORT

Customer:	**Times Microwave Systems** 4 School Brae Dysart Fife KY1 2XB
Material Description:	54173 FBT 600 cable
Test Specification:	Airbus Industrie ABD0031: 1996 Airbus Directives (ABD) and Procedures Fireworthiness Requirements – Pressurized Section of Fuselage
Date:	1st December 2008

Summary

The sample of 54173 FBT 600 cable, supplied by Times Microwave Systems, submitted for testing in accordance with ABD0031, detailed in this report, achieved the following results:-

prEN 3475 – 601: Smoke density results:

Test Mode	Criteria of Ds at 240 seconds	Average Dm at 240 seconds	Result
Flaming	200	0.02	PASS
Non-flaming	200	0.2	PASS

prEN 3475 – 602: Toxicity results:

Gas Component	Limit of Concentration (ppm)	Average amount present (ppm)		
		Flaming	Non-flaming	Result
Hydrogen Fluoride, HF	100	59	ND	**PASS**
Hydrogen Chloride, HCl	150	ND	ND	**PASS**
Hydrogen Cyanide, HCN	150	ND	ND	**PASS**
Sulfur Dioxide, SO_2	100	ND	3	**PASS**
Hydrogen Sulphide, H_2S	100	ND	ND	**PASS**
Nitrous Gases, NO_X	100	2	ND	**PASS**
Carbon Monoxide, CO	1000	43	6	**PASS**

where ND = not detected

AITM 2.0005: 60° Bunsen burner test:

	Criteria	Average
Average after flame time (s)	≤ 30	9
Average burn length (mm)	≤ 76	31

1. Objective

To assess the fire characteristics of a 54173 FBT 600 cable, supplied by Times Microwave Systems, when tested to the following specifications:-

1. Airbus Industrie ABD0031: 2005
   Airbus Directives (ABD) and Procedures
   Fireworthiness Requirements – Pressurized Section of Fuselage

2. AECMA standard prEN 3475 – 601: March 2005
   Aerospace series
   Cables, electrical, aircraft use
   Test method Part 601: Smoke Density

3. AECMA standard prEN 3475 – 602: March 2005
   Aerospace series
   Cables, electrical, aircraft use
   Test method Part 602: Toxicity

4. Airbus Industrie Test Method, AITM 2.0005
   Issue 1A. October 1993.
   Flammability of non-metallic materials –
   Small burner test, 60 °

The tests quoted in this test report are covered within the scope of our UKAS schedule, in accordance with BS EN ISO/IEC 17025, except where stated.

2. Sample

2.1 The sample was received by QinetiQ on 13th October 2008, and given the unique reference number HAJ 296.

2.2 The sponsor identified the sample as a 54173 FBT 600 cable. No further details were supplied.

2.3 The sample was found to be an orange/brown coloured cable. It was supplied as 1 single piece of finished product, approximately 16 metres in length and 14 mm in diameter.

3. Conditioning

The specimens were conditioned to equilibrium at 23 ± 2°C and 50 ± 5 % relative humidity for a minimum of 24 hours prior to the start of any testing.

4. AECMA Standard prEN 3475 – 601 / 602: March 2005 Aerospace series. Cables, electrical, aircraft use. Test Method for smoke and toxicity.

4.1 Specimen size: 6 off finished product, placed in holder and backed by non-combustible board.

4.2 Date of test: 17th through to 25th November 2008

4.3 Toxicity results:

4.3.1 Toxicity results from flaming mode:

Gas Component	Limit of Concentration (ppm)	Concentration of gas present (ppm)			
		Run 1	Run 2	Run 3	Average
Hydrogen Fluoride, HF	100	61	58	61	**59**
Hydrogen Chloride, HCl	150	ND	ND	ND	**-**
Hydrogen Cyanide, HCN	150	ND	ND	ND	**-**
Sulfur Dioxide, SO_2	100	ND	ND	ND	**-**
Hydrogen Sulphide, H_2S	100	ND	ND	ND	**-**
Nitrous Gases, NO_X	100	2.5	2	2.5	**2**
Carbon Monoxide, CO	1000	40	45	40	**43**

where ND = not detected

4.3.2 Toxicity results from non-flaming mode:

Gas Component	Limit of Concentration (ppm)	Concentration of gas present (ppm)			
		Run 4	Run 5	Run 6	Average
Hydrogen Fluoride, HF	100	ND	ND	ND	**-**
Hydrogen Chloride, HCl	150	ND	ND	ND	**-**
Hydrogen Cyanide, HCN	150	ND	ND	ND	**-**
Sulfur Dioxide, SO_2	100	3	3	3	**3**
Hydrogen Sulphide, H_2S	100	ND	ND	ND	**-**
Nitrous Gases, NO_X	100	ND	ND	ND	**-**
Carbon Monoxide, CO	1000	6	6	6	**6**

where ND = not detected

4.4 Smoke results:

4.4.1 Specific Optical Density:

$$D_S = 132 \log\left[\frac{100}{T}\right]$$

4.4.2 Smoke data:

Run	Test Mode	Specific optical density at 240 s (Ds_{max})	Time to Ignition (s)
1	Flaming	0.06	-
2		0.01	-
3		0.00	-
4	Non-flaming	0.30	-
5		0.15	-
6		0.24	-

4.4.3 Average Results:

Test Mode	Average Dm at 240 seconds	Result
Flaming	0.02	**PASS**
Non-flaming	0.23	**PASS**

4.5 Comment: No significant phenomena were observed.

4.6 Analyst: A Chapman

5. Airbus Industrie Test Method, AITM 2.0005 Issue 1A. October 1993. Flammability of non-metallic materials – Small burner test, 60 °

5.1 Specimens:

Approximate Dimensions (mm)		
Length	Width	Thickness
800	14 (overall diameter)	N/A

5.2 Date of test: 17th November 2008

5.3 Data for specimens:

	Run 1	Run 2	Run 3	**Average**
Afterflame time (s)	7	8	11	**9**
Length burnt (mm)	27	34	31	**31**
Flaming droplets	No	No	No	**-**
Afterflame time of droplets	-	-	-	**-**

5.4 Test criteria: average burn length shall not exceed 76 mm, afterflame time shall not exceed 30 seconds, afterflame time of droplets shall not exceed 3 seconds.

5.5 Classification: PASS

5.6 Comments: No significant phenomena was observed.

5.7 Analyst: C Chong

6. Conclusion

The sample of 54173 FBT 600 cable, supplied by Times Microwave Systems, submitted for testing in accordance with ABD0031, detailed in this report, achieved the following results:-

prEN 3475 – 601: Smoke density results:

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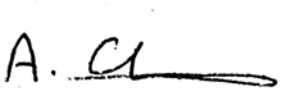
AITM 2.0005: 60° Bunsen burner test:

	Criteria	Average
Average after flame time (s)	≤ 30	9
Average burn length (mm)	≤ 76	31

"These tests alone do not assess the fire hazard of the material, or a product made from this material, under actual fire conditions. Consequently, the results of these tests shall not be quoted in support of claims with respect to the fire hazard of the material or product under actual fire conditions. The results when used alone should only be used for research and development, quality control and material specifications."

Prepared by:



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A Chapman
Research Scientist

Authorised by:

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C Chong
Project Manager

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