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## TEST REPORT

**Sponsor's reference:** KdB Isolation SA  
2; rue Lotz Cossé  
B.P. 47506  
44275 NANTES Cedex 2 – France

**Application date:** June 19<sup>th</sup> 2003

**Nature of tests:** Test for surface flammability

**Reference documents:** Resolution MSC.61 (67) – part 5 (1996)  
IMO Resolution A.653 (16) (1993)  
SOLAS 2000 as amended

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## 1 DESCRIPTION OF TEST SPECIMENS

The sponsor supplied on July 23<sup>rd</sup> 2003 to the Laboratoire National d'Essais specimens of the material referenced "AIRFLEX" and gave the following informations:

- producer: DIGITEX  
14, rue de l'Eure  
49600 LE FIEF SAUVIN - FRANCE,
- composition: complex with Aluminium (30  $\mu\text{m}$ ), polyethylen film with bubbles (150  $\mu\text{m}$ ), polyethylen foam with closed cells (25  $\text{kg}/\text{m}^3$ ), Aluminium (30  $\mu\text{m}$ ), polyethylen film with bubbles (150  $\mu\text{m}$ ),
- flame retardant treatment: Antimony oxide,
- weight per unit area: about 615  $\text{g}/\text{m}^2$ ,
- tested thickness: about 10 mm (end-use thickness),
- colour: aluminium white with bright appearance,
- exposed face: same faces
- end-use: Walls, partitions, boarding and ground.

## 2 TEST PROCEDURES

International Maritime Organization has defined specific requirements for materials used in bulkhead, ceiling and deck finish. These should be conform to flammability and spread of flame criteria, as well as heat release criteria, when they are evaluated in compliance with the Part 5 of the Annex 1 of the Resolution MSC.61 (67), corresponding to the IMO Resolution A.653 (16).

Prior to the tests, the rectangular specimens (800 mm x 155 mm), have been conditioned at a temperature of  $(23 \pm 2) ^\circ\text{C}$  and a relative humidity of  $(50 \pm 10) \%$ .

At least three specimens have been exposed in vertical orientation to a graded radiant flux field (from 1.5  $\text{kW}/\text{m}^2$  to 50.5  $\text{kW}/\text{m}^2$ ) supplied by a methane-fired radiant panel. One acetylene/air pilot flame located on the upper exposed edge of the specimen may ignite volatile gases.

Time to ignition, spread of flame, and its final extinguishment distance are measured. Critical flux at extinguishment (CFE) and Heat for sustained burning ( $Q_{sb}$ ) are given by the heat flux calibration with spread distance.

Moreover, Total heat release ( $Q_t$ ) and Peak heat release rate ( $q_p$ ) are given by the heat release data generated during each test. The calibration of the heat release has been carried out by burning variable volumes of pure methane gas.

The test is finished when any one of the following is applicable:

- the specimen fails to ignite after a 10-minute exposure.
- 3 minutes have passed since all flaming from the specimen ceased, with a minimum test period of 10 minutes.
- flaming reaches the end of the specimen or self-extinguishes.
- the combustion with flame is not terminated after 40 minutes.

Tests have been performed on August, 14<sup>th</sup> 2003.

### 3 TEST RESULTS

Expressed in second, time to ignition, surface spread of flame and duration of test are collected in Appendix 1. The final travels, expressed in millimeter, are indicated with possible observations during test.

The heat release data generated during test is given in Appendix 2.

The values calculated for each criterion:

- critical flux at extinguishment (CFE) expressed in kilowatt per square meter ( $\text{kW/m}^2$ ),
- average heat for sustained burning ( $Q_{sb}$ ) expressed in megajoule per square meter ( $\text{MJ/m}^2$ ),
- total heat release ( $Q_t$ ) expressed in megajoule (MJ),
- peak heat release rate ( $q_p$ ) expressed in kilowatt (kW),

as well as the averages of the parameters above are as follows:

specimen n° :	CFE ( $\text{kW/m}^2$ )	$Q_{sb}$ ( $\text{MJ/m}^2$ )	$Q_t$ (MJ)	$q_p$ (kW)
1	*	*	< 0,05	< 0,1
2	*	*	< 0,05	< 0,1
3	*	*	< 0,05	< 0,1
<b>AVERAGE</b>	*	*	<b>&lt; 0,05</b>	<b>&lt; 0,1</b>

\*: unable to calculate due to insufficient flame travel (no ignition of specimens).

#### 4 CONCLUSION

Materials giving average values for all the surface flammability criteria not exceeding those listed below can be considered to meet the requirements of the regulations II-2/3.8, II-2/34 and II-2/49 of the International Convention for the Safety Of Life At Sea (SOLAS), 2000, as amended:

<i>Bulkhead, wall and ceiling linings</i>				<i>Floor coverings</i>			
<i>CFE (kW/m<sup>2</sup>)</i>	<i>Q<sub>sb</sub> (MJ/m<sup>2</sup>)</i>	<i>Q<sub>t</sub> (MJ)</i>	<i>q<sub>p</sub> (kW)</i>	<i>CFE (kW/m<sup>2</sup>)</i>	<i>Q<sub>sb</sub> (MJ/m<sup>2</sup>)</i>	<i>Q<sub>t</sub> (MJ)</i>	<i>q<sub>p</sub> (kW)</i>
<b>≥ 20.0</b>	<b>≥ 1.5</b>	<b>≤ 0.7</b>	<b>≤ 4.0</b>	<b>≥ 7.0</b>	<b>≥ 0.25</b>	<b>≤ 2.0</b>	<b>≤ 10.0</b>

Accordingly, the material referenced "AIRFLEX" meets all the criteria given in the International Maritime Organization Resolution A.653 (16) and can therefore be considered to have low flame spread in compliance with the International Convention for the Safety of Life at Sea, 2000, as amended.

This report is a translation of the test report n° D060965 – CEMAT/2 written on September 8<sup>th</sup> 2003

Trappes, June 5<sup>th</sup> 2007

The Head of the  
FIRE BEHAVIOUR Division



Alain SAINRAT



Responsible for Test



Mélinda AYRAULT

The results specified are only applicable to the samples, products or materials submitted to LNE, such as they are defined in this document.

APPENDIX 1

TEST RESULTS

Material "AIRFLEX"

Time to travel (min,s) :	Specimen 1		Specimen 2		Specimen 3	
	min	s	min	s	min	s
50 mm	-	-	-	-	-	-
100 mm	-	-	-	-	-	-
150 mm	-	-	-	-	-	-
200 mm	-	-	-	-	-	-
250 mm	-	-	-	-	-	-
300 mm	-	-	-	-	-	-
350 mm	-	-	-	-	-	-
400 mm	-	-	-	-	-	-
450 mm	-	-	-	-	-	-
500 mm	-	-	-	-	-	-
550 mm	-	-	-	-	-	-
600 mm	-	-	-	-	-	-
650 mm	-	-	-	-	-	-
700 mm	-	-	-	-	-	-
750 mm	-	-	-	-	-	-
Time to ignition (min,s) :	-	-	-	-	-	-
Time to extinction (min,s) :	-	-	-	-	-	-
Duration of test (min) :	10		10		10	
Final travel (mm) :	-		-		-	

Observations during tests :

The test is finished when the specimen fails to ignite after a 10-minute exposure

The last specimen has been tested with the pilot flame angled.

APPENDIX 2  
Heat Release from specimens

"AIRFLEX"

