



# CERTIFICATE

## Measurement of Heat Release Rate and the Heat Release

acc. to JAR/FAR/CS 25, App. F, Part IV

Test Report No.

**HR-386/1013**

**Client:** 5 M s.r.o.

**Designation:** V13/200-203

**Specimen Description:** Sandwich panel\_thickness 10 mm -Letoxit LFX 062/glass reinforcement + aerograde nomex honeycomb

**Thick. of spec.:** 10,1 mm

**Conditioning:** 24 hr, 21±3°C, 50±5% rel. humidity

**Calibr. factor:** 0,34 kW/mV \* m<sup>2</sup>

**Air distribution:** 40 l/sec

**Baseline voltage:** 22,7 mV

**Heat flux density:** 3,5 W/cm<sup>2</sup>

No.	Weight [g]	HRR*		HR** [kW * min / m <sup>2</sup> ]
		[kW / m <sup>2</sup> ]	at [s]	
1	49,1	29,37	240	20,93
2	47,1	42,42	25	24,46
3	48,3	29,01	237	27,30
	<b>Mean</b>	<b>33,60</b>	---	<b>24,23</b>
	<i>Limit</i>	65	---	65

\*less than 65 kW/m<sup>2</sup> for a peak heat release rate

\*\*less than 65 kW\*min/m<sup>2</sup>, for the 2-minute total heat release (for the average of triplicate sample measurements)

**Remarks:**

**Test passed:**

Yes  / No

**Deutsches Zentrum  
für Luft- und Raumfahrt e. V.  
Institut für Antriebstechnik  
Versuchsgelände Trauen**

The *Material Test Center-Fire Performance* is part of DLR-Design Organisation since 22.12.2005. The DLR-Design Organisation has been approved under the authority of the German Aviation Authority (LBA) Certificate No.: LBA.21J.0005

These test results are in correspondence with the FAR/JAR/CS-25-Requirements!

Applied Test Method: Chapter 5 / Aircraft Materials Fire Test Handbook DOT/FAA/AR-00/12

**Date:**

29.10.2013

**Prepared:**

*Boeynik*

**Approved:**

*[Signature]*



# CERTIFICATE

## Determination of the Toxic Components on Combustion Products acc. to ABD 0031 & AITM 3.0005

Test Report No.  
**ABD-076/1113**

Client: 5 M s.r.o.

Designation: V13/184-187

**Specimen Description:** Sandwich panel\_thickness 10 mm -Letoxit LFX 062/glass reinforcement + aerograde nomex honeycomb

**Thick. of spec.:** 10,2 mm

**Conditioning:** 24 hr, 21±3°C, 50±5% rel. humidity

Gas (all values in ppm)	Limit*	Flaming Mode (F)			Non-Flaming Mode (NF)		
		No.	Result	Mean	No.	Result	Mean
<b>HCN</b> <i>Hydrogen Cyanide</i> <sup>1</sup>	150	1	1		1		
		2	1	1	2		
		3			3		
<b>CO</b> <i>Carbon Monoxide</i> <sup>2</sup>	1000	1	71		1		
		2	98	85	2		
		3			3		
<b>NO<sub>x</sub></b> <i>Nitrous Fumes</i> <sup>2</sup>	100	1	4		1		
		2	5	5	2		
		3			3		
<b>SO<sub>2</sub></b> <i>Sulphur Dioxide</i> <sup>2</sup>	100	1	3		1		
		2	5	4	2		
		3			3		
<b>HF</b> <i>Hydrogen Fluoride</i> <sup>1,3</sup>	100	1	0		1		
		2	0	0	2		
		3			3		
<b>HCl</b> <i>Hydrogen Chloride</i> <sup>1</sup>	150	1	0		1		
		2	0	0	2		
		3			3		

### Remarks:

Specimen tested in conjunction with Smoke Density-Test No.: **SD-086/1113**

Test passed:

Yes

No

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für Luft- und Raumfahrt e. V.  
Institut für Antriebstechnik  
Versuchsgelände Traarhof**

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Analytical methods: <sup>1</sup> Colorimetric Tubes, <sup>2</sup> Electrochemical/Gas Analyzer, <sup>3</sup> ISE ( acc. AITM 3.0005/Issue 2)

\*Airbus

Date:

06.11.2013

Prepared:

*Boezmich*

Approved:

*[Signature]*



# CERTIFICATE

## Measurement of Smoke Density

acc. to JAR/FAR/CS 25, App. F, Part V

Test Report No.

**SD-086/1113**

**Client:** 5 M s.r.o.

**Designation:** V13/184-187

**Specimen Description:** Sandwich panel\_thickness 10 mm -Letoxit LFX 062/glass reinforcement + aerograde nomex honeycomb

**Thick. of spec.:** 10,2 mm

**Conditioning:** 24 hr, 21±3°C, 50±5% rel. humidity

<i>Limit</i> ( $D_s$ after 4 min)	Flaming Mode (F)			Non-Flaming Mode		
	No.	Result	Mean	No.	Result	Mean
<i>max. 200</i>	1	40		1		
	2	45	48	2		
	3	60		3		

$D_s$  = specific optical smoke density (after 4 min)

**Remarks:**

Specimen tested in conjunction with Toxicity - Test No.: ABD-076/1113

**Test passed:**

Yes  / No

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These test results are in correspondence with the FAR/JAR/CS-25-Requirements!

Applied Test Method: Chapter 6 / Aircraft Materials Fire Test Handbook DOT/FAA/AR-00/12

**Date:**

06.11.2013

**Prepared:**

*Boejvick*

**Approved:**

*[Signature]*



# CERTIFICATE

## Bunsen Burner Test

acc. to FAR/JAR/CS 25, App. F, Part I

Test Report No.

**FL-176/1113**

**Client:** 5 M s.r.o.

**Designation:** V13/192-195

**Specimen Description:** Sandwich panel\_thickness 10 mm -Letoxit LFX 062/glass reinforcement + aerograde nomex honeycomb

**Thick. of spec.:** 10,1 mm

**Conditioning:** 24 hr, 21±3°C, 50±5% rel. humidity

Sample No.	Vertical – 60s Ignition Time		
	Burn Length [mm]	Flame Time [s]	Drip Flame Time [s]
1	90	4	0
2	91	7	0
3	115	0	0
<b>Mean</b>	<b>99</b>	<b>4</b>	<b>0</b>
<i>Limit:Max.</i>	152	15	3

Sample No.	Vertical – 12s Ignition Time		
	Burn Length [mm]	Flame Time [s]	Drip Flame Time[s]
1			
2			
3			
<b>Mean</b>			
<i>Limit:Max.</i>	203	15	5

Sample No.	Horizontal - 15s Ignition Time
	Burn Rate [mm/min]
1	
2	
3	
<b>Mean</b>	
<i>Limit:Max.</i>	2.5inch (64mm) / min

Sample No.	Horizontal - 15s Ignition Time
	Burn Rate [mm/min]
1	
2	
3	
<b>Mean</b>	
<i>Limit:Max.</i>	4.0inch (102mm) / min

Sample No.	45° - 30s Ignition Time		
	Flame Time [s]	After Glow [s]	Flame Penetration
1			<input type="checkbox"/>
2			<input type="checkbox"/>
3			<input type="checkbox"/>
<b>Mean</b>			---
<i>Limit:Max.</i>	15	10	None

Sample No.	60° - 30s Ignition Time		
	Burn Length [mm]	Flame Time [s]	Drip Flame Time [s]
1			
2			
3			
<b>Mean</b>			
<i>Limit:Max.</i>	76	30	3

### Remarks:

**Test passed:**

Yes  / No

**Deutsches Zentrum für Luft- und Raumfahrt e. V. Institut für Antriebstechnik Versuchsgelände Trauen**

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Applied Test Methods: Chapter 1-4 / Aircraft Materials Fire Test Handbook DOT/FAA/AR-00/12

**Date:**

04.11.2013

**Prepared:**

*Boejink*

**Approved:**

*[Signature]*