



Reg.no. 2005/087037/23

P O Box 72169

**LYNNWOOD RIDGE**

0040

kobus@firelab.co.za

peet@firelab.co.za

Phone: (012) 349 2929

Fax: (012) 349 1519

Cell: 082 892 4565

Cell: 082 321 4269

**Our reference: FTC 17/060**

**H Systems (Pty) Ltd**

Unit 3, Poplar Park

16 Lancaster Road

**BENONI SOUTH**

1508

**Attention: Mr. Len Fox**

13 June 2017

Dear Sir

## **SURFACE FIRE INDEX: SANS 10177 – PART 3: H CLAD**

### **1. SPECIMEN DESCRIPTION**

A specimen was delivered to assess its fire performance as a decorative facade wall panel and to classify the use in terms of **SANS 10177 – Part 3**. The specimen was also tested for toxicity of combustion products. Both tests were conducted on 6 June 2017.

The sample tested was identified as follows:

<b>Product name:</b>	H Clad
<b>Composition:</b>	Two sheets aluminum surrounding a PU core
<b>Product No:</b>	HC001/HD-402
<b>Mass:</b>	*Approx. 6 850 g/m <sup>2</sup>

Company and product details are given in **Annexure “A”**.

\*The sample was weighed by **FIRELAB**

## 2. TEST PROCEDURES

### 2.1. SANS 10177 – 3: SURFACE FIRE INDEX OF FINISHING MATERIALS

The test specimen (2 400 mm long by 350 mm wide) as supplied by **H System** was tested in accordance with the **SANS 10177 – 3** test protocol for the required test duration of 18.5 minutes.

A smoke cell in the chimney of the test apparatus recorded the percentage light obscuration while a copper rod recorded the stack temperature. Flame spread distance was also recorded.





Based on the readings and observations, a Smoke Emission Index, a Heat Contribution Index and a Spread of Flame Index were calculated. The arithmetic mean (average) of these three indices is referred to as the **Surface Fire Index (SFI)**.

The table below shows the various indexes and the maximum average **Surface Fire Index (SFI)** values for the different classifications (**Class 1 to 5**):

Classification Table: Surface Fire Index (SFI)				
Class	Spread of Flame Index	Heat Contribution Index	Smoke Emission Index	Surface Fire Index (SFI)
1	0.1	0.1	0.2	0.1
2	0.7	0.8	1.0	0.6
3	1.5	1.7	2.0	1.2
4	3.5	3.8	4.0	2.9
5	5.5	5.8	6.0	4.5

Figure 2.1.1: Classification of surface finish

#### Equipment used during the test:

-  Data logging equipment c/w controller
-  Stopwatch
-  Two Type K thermocouples
-  **SANS 10177 – 3** Furnace

## 2.2. DEFSTAN (NES 713): TOXICITY OF COMBUSTION GASES




One gram ( $1 \text{ g} \pm 5 \text{ mg}$ ) of the material was burned in a chamber with a volume of  $1 \text{ m}^3$ . The concentrations of certain specified gases were determined by means of colorimetric (Dräger) tubes. These concentrations were then used to calculate the quantities of gases given off by burning 100 g of material in a cubic meter ( $1 \text{ m}^3$ ) of air.

The toxicity index is calculated from the summation of the ratios of these concentrations to the concentrations causing fatality to man after a 30-minute exposure time. Gases to be determined and their fatality limits are:

Gas	Chemical Formula	Conc. (ppm)	Gas	Chemical Formula	Conc. (ppm)
Carbon Dioxide	CO <sub>2</sub>	100 000	Nitrous Oxides	N <sub>2</sub> O	250
Carbon Monoxide	CO	4 000	Hydrogen Cyanide	HCN	150
Formaldehyde	CH <sub>2</sub> O	500	Acrylonitrile	C <sub>3</sub> H <sub>3</sub> N	400
Hydrogen Fluoride	HF	100	Ammonia	NH <sub>3</sub>	750
Hydrogen Chloride	HCl	500	Sulphur Dioxide	SO <sub>2</sub>	400
Hydrogen Bromide	HBr	150	Hydrogen Sulphide	H <sub>2</sub> S	750
Phenol	C <sub>6</sub> H <sub>5</sub> OH	250	Phosgene	COCl <sub>2</sub>	25

Table 2.2.1: Noxious gases with its lethal limits after 30 minutes of exposure

### Equipment used during the test:

-  Dräger tubes (various as per test protocol)
-  Dräger pump
-  Toxicity Test facility

### 3. TEST RESULTS

#### 3.1. SANS 10177 – 3: SURFACE FIRE INDEX OF FINISHING MATERIALS

H Systems – H Clad	
Spread of Flame Index	0.000
Heat Contribution Index	0.083
Smoke Emission Index	0.022
<b>Surface Fire Index (SFI)</b>	<b>0.035</b>
<b>Classification</b>	<b>1</b>

Figure 3.1.1: Test results and classification of the material as a surface finish

#### 3.2. DEFSTAN (NES 713): TOXICITY OF COMBUSTION GASES

H Systems – H Clad			
Gas detected	Chemical Formula	Conc./100 g (ppm)	Toxicity Index
Carbon Dioxide	CO <sub>2</sub>	110 000	1.100
Carbon Monoxide	CO	3 000	0.750
Hydrogen Chloride	HCl	-	-
Nitrous Oxides	N <sub>2</sub> O	Traces	-
Hydrogen Cyanide	HCN	Traces	-
Sulphur Dioxide	SO <sub>2</sub>	-	-
Hydrogen Sulphide	H <sub>2</sub> S	-	-
<b>Total Toxicity Index</b>			<b>1.850</b>

Figure 3.2.1: Toxicity test results

## 4. DISCUSSION

### 4.1. SANS 10177 – 3: SURFACE FIRE INDEX OF FINISHING MATERIALS

The specimen had no flame spread, only heat damage occurred. The respective test protocol requires that two samples be tested. Only one sample was tested since no flame spread occurred.

### 4.2. DEFSTAN (NES 713): TOXICITY OF COMBUSTION GASES

The toxicity levels of the combustion gases released by the sample (representative of composition) are well within acceptable levels. The release of the gases was caused by the PU core.

## 5. CONCLUSION

**H Clad** is classified as a **Class 1** surface finish material when tested in accordance with the **SANS 10177 – Part 3** test protocol.

The Spread of Flame, Heat Contribution and Smoke Emission Indexes did not exceed the **Surface Fire Index (SFI)** of 0.1 for a Class 1 Index.


From a fire safety point of view, the product can therefore only be used in locations where the minimum requirement is a **Class 1** surface finish.


Yours faithfully



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**FIRELAB**

**ANNEXURE “A”**

<b>– Company Information –</b>		 <b>FIRELAB</b>
<b>Company Name:</b>	H Systems (Pty) Ltd.	
<b>Company Trading Name:</b>	H systems	
<b>Company Registration Nr.:</b>	2005/009864/07	
<b>Company VAT Nr.:</b>	4140221898	
<b>Core Business Activities:</b>	Fenestration and hardware	
<b>Postal Address:</b>		
<b>Physical Address:</b>	Unit 3 Poplar Park , 16 Lancaster Road , Benoni South, Gauteng, 1508	
<b>Company contact number:</b>		
<b>Direct Contact Details</b>		
<b>Technical (name):</b>	Len Fox	
<b>Cell phone number:</b>	0794986234	
<b>Email address:</b>	Lenf@hsystems.co.za	
<b>Financial (name):</b>	Wendy Ann Baily	
<b>Cell phone number:</b>	0333861447	
<b>Email address:</b>	wendya@doorhardware.co.za	
<b>– Test &amp; Sample Information –</b>		
<b>Type of Test:</b>	SABS 0177- part 3	
<b>Sample/Product name:</b>	H Clad	
<b>Manufacturing Date:</b>		
<b>Batch/Product Number:</b>	HC001 ( International supplier code – HD-402	
<b>Sample/Product Description:</b>	<p>The product is called H CLAD.</p> <p>It is a two sheets of aluminium on either side of a polyurethane core.</p> <p>It is used for signage and surface finishing on buildings. Generally replaces glass to cover area where the concrete slab is visible.</p>	
<i>(Short description of sample or product submitted for testing)</i>		

<b>SANS 10177 – PART 3 and 4 Product Information</b>		 <b>FIRELAB</b>
<b>Product Trade Name:</b>	H CLAD	
<b>Product Manufacturer:</b>		
<b>Product Code No.:</b>	HC001 ( International supplier code – HD-402	
<b>Date of Manufacturing:</b>		
<b>Actual Mass (g/m<sup>2</sup>):</b>	Approx. 5610	
<b>Carpet/Tile (Part 4 only):</b>		
<b>Product Composition</b>	<i>2 sheets of aluminum surrounding a polyurethane core.</i>	
<i>Number of Layers, Composition and Mass:</i>	<i>3 layers                      1 layer 0.5mm aluminum sheet                      1 layer 3mm polyurethane core.                      1 layer 0.5mm aluminum sheet</i>	
<b>Installation Details:</b>	See attached PDF. Installation is mainly done with the use of aluminum angles.	

OCTOBER 2016