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BRE Global Test Report

BS EN 13823: 2020 Single Burning Item (SBI) test on Futural pre-coated aluminium cladding panel also known as HJ TECH PVDF Pre-coated Solid Aluminium

Prepared for: Anhui HJ Tech Co., Ltd.

Date: 24 February 2023

Report Number: P122325-1003 Issue 1

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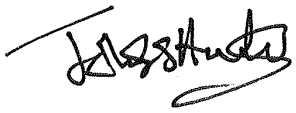
Signature 

Table of Contents

1 Objective

To assess the performance of the sample described in Section 2 of this report when subjected to the tests specified in BS EN 13823: 2020[1].

2 Sample

2.1 Traceability

The test samples were supplied by the test sponsor. BRE Global was not involved in the sample selection process and therefore cannot comment upon the relationship between the samples supplied for test and the product supplied to market. The results apply to the sample as received.

2.2 Description of sample and test format

Unless otherwise stated all measurements are nominal.

Parameter	**Details**
Test sponsor	Anhui HJ Tech Co., Ltd. #568 South Huizhou Rd. Chuzhou City Anhui Province China 239065
Manufacturer of sample	Anhui HJ Tech Co., Ltd. #568 South Huizhou Rd. Chuzhou City Anhui Province China 239065
Place of manufacture	China
Trade names	• Futural • HJ TECH PVDF Pre-coated Solid Aluminium
Product reference/number	Futural or HJ TECH PVDF Pre-coated Solid Aluminium
Sample description (as provided by test sponsor/manufacturer)	PVDF pre-coated aluminium. The test sponsor's product description is shown in Appendix A of this report.
Description of sample (as received)	Nominal 3 mm-thick, dark grey pre-coated metal sheet. Batch one was provided as a jointed specimen, comprising five individual panels. Batch two consisted of two unjointed specimens, comprising two pieces each.
Test sponsor's product data	
Generic type of product	PVDF pre-coated aluminium
Nominal product thickness (mm)	3

Parameter	Details
Nominal thickness of coating (µm)	38 ± 8
Nominal density (g/cm³)	2.7 [2700 kg/m³]
Nominal mass per unit area of product (kg/m²)	8.1
Nominal mass per unit area of coating (kg/m²)	0.038
Colour	Dark Grey
Flame retardant treatment added, or organic content limited during production (yes/no)	No. Note: The coating is a thermoplastic fluoropolymer.
European product standard, if applicable	Note 1
Substrate and ventilation conditions	
Generic type	Calcium silicate
Nominal thickness (mm)	12
Nominal density (kg/m³)	870 ± 50
Nominal mass per unit area (kg/m²)	10.44 ± 0.6
Type of air gap	80 mm-deep, ventilated cavity
Position of air gap	Between the back face of the test specimen and the front face of the 12 mm-thick calcium silicate board
Measured sample data, determined by BRE Global @ 23 °C ± 2 °C and 50 % ± 5 % RH	
Mean sample thickness (mm)	Batch 1: 2.83 (range 2.77 to 2.88) Batch 2: 2.84 (range 2.82 to 2.85)
Mean sample mass per unit area (kg/m²)	Batch 1: 7.84 (range 7.81 to 7.93) Batch 2: 7.88
Test information	
Face to be tested	Coated face
Orientation aspects	The dark grey pre-coated face was the interior (test) face
Test sponsor's sampling identification	HJ001
BRE Global sample number	Batch 1: E14494 Batch 2: E14589
Sample receipt date	Batch 1: 05 October 2022 Batch 2: 13 December 2022
Date into conditioning	Batch 1: 05 October 2022 Batch 2: 13 December 2022
Date of test	Batch 1: 21 October 2022 Batch 2: 03 February 2023
Additional information	Batch 1 was tested under the following BRE reference: P122325-1002.

Note 1: This information was not supplied by the test sponsor.

2.3 Description of substrate and fixing

The test specimen was mounted to a steel frame using nuts, bolts, and washers.

In Run 1, the fixings were located at the corners of each individual panel.

In Runs 2 and 3, the fixings were positioned adjacent to the top and bottom edges of the test specimen and across the mid-point of the wings at a height of approximately 0.75m. The frame and fixing locations are shown in Appendix A of this report.

2.4 Jointing details: Run 1

- A vertical joint was incorporated into the long wing of the test specimen, at a distance of 200 mm from the finished face of the short wing.
- A horizontal joint was incorporated into the long wing of the test specimen, at a height of 500 mm from the base of the long wing.
- All joints were open butt-joints. The joint width was nominally 5 mm.

2.5 Jointing details: Runs 2 and 3

- There were no joints present in the test specimen, other than the corner joint between the two wings.

2.6 Mounting technique

A framework was used to create an 80 mm-deep ventilated cavity between the back face of the test specimen and the front face of a calcium silicate board.

The SBI equipment was placed in the arrangement used for testing products that are free standing or that have a ventilated cavity in their end use application. This necessitated replacing the two side panels by half panels, covering only the upper half of the side openings.

3 Conditioning

The test specimens were conditioned as required by the test standard.

4 Results

4.1 Tabulated data

Table 1: Event summary

Event	Occurrence of event (Yes/No)		
Run Number	1	2	3
Calorimeter code	S211022C	S030223C	S030223D
BRE Global sample number	E14494	E14589	E14589
Occurrence of a surface flash	No	No	No
Smoke from the specimen not entering the hood during the test	No	No	No
Falling of parts of the specimen	No	No	No
Development of a gap in the corner (mutual fixing of backing boards fails)	No	No	No
Occurrence of one or more conditions which justify an early termination of the test	No	No	No
Distortion (1) or collapse (2) of the specimen	Yes (1)	Yes (1)	Yes (1)
Test duration (s)	1560	1560	1560
Any other event	See observations		

Note:

Specimens with an average rate of smoke production value, RSP_{av}, of not more than 0.1 m²/s during the total test period or a total smoke production value of not more than 6 m² over the total test period have a SMOGRA value of zero.

The fire growth rate indices are calculated only for that part of the exposure period in which the threshold levels for $RHR_{av}(t)$ and THR have been exceeded. If one or both threshold values are not exceeded during the exposure period, FIGRA is equal to zero. The threshold value used for $RHR_{av}(t)$ is 3 kW. Two different THR threshold values are used, resulting in $FIGRA_{0.2MJ}$ and $FIGRA_{0.4MJ}$.

Values of THR_{600s} and TSP_{600s} refer to a time of 600 s after the flame has been applied to the specimen. This is 300 s after the start of the test, and therefore represents a time of 900 s in the graphs presented below.

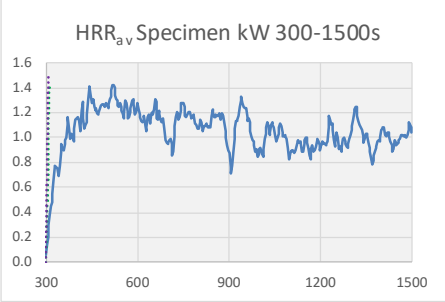
The results of a test are not valid for classification purposes when an early termination of the test has occurred.

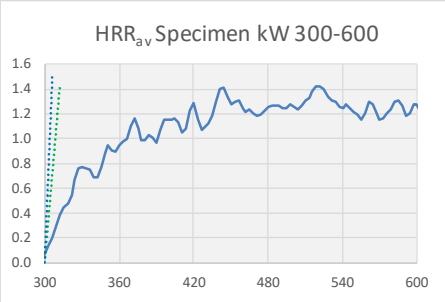
4.2 Observations

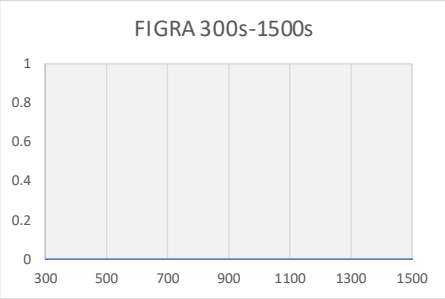
Run	Time (s)	Comments
1	303	The main burner was ignited.
	390	The main burner was ignited.
	516	There was some distortion of the short wing.
	708	The coating delaminated in the corner area.
	921	Non-flaming debris was observed.
2	301	The main burner was ignited.
	694	Non-flaming debris was observed.
	735	Non-flaming debris was observed.
	1560	Distortion of both wings was evident at the ends of the test duration.
3	301	The main burner was ignited.
	384	There was some distortion of the short wing.
	462	The coating delaminated in the corner area on the short wing.
	471 - 876	Several occurrences of non-flaming debris were observed.
	1560	Distortion of both wings was evident at the ends of the test duration.

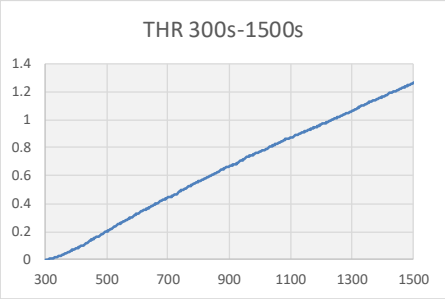
4.3 Graphical outputs and summary data

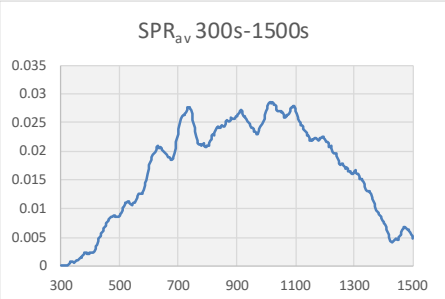
General Information		**Product**	
Product Identification	Futural coated aluminium cladding panel	Sample number	E14494
		Substrate	12 calcium silicate
Standard used	BS EN 13823	Mounting	80 mm ventilated cavity
Date of test	21/10/2022	Joints	Horizontal and vertical
Filename	s211022c.rw1		
Report reference	P122325-1003		
		Conditioning	
Laboratory		Conditioned	Yes
Laboratory name	BRE Global	Time interval	Held on file
Operator	C A Rock	Weight 1 (g)	Held on file
		Weight 2 (g)	Held on file
Test Results			
THR_{600}	0.67	**Additional Information**	
$FIGRA_{0.2MJ}$	0.00	Time to $FIGRA_{0.2MJ}$ (s)	#N/A
$FIGRA_{0.4MJ}$	0.00	Time to $FIGRA_{0.4MJ}$ (s)	#N/A
TSP_{600}	8.80	Time to SMOGRA (s)	#N/A
SMOGRA	0.00		
Comments			
LFSedge {Y/N}	No		
FDP (f =< 10s) {Y/N}	No	**Chart Lengend**	
FDP (f > 10s) {Y/N}	No	B FIGRA Threshold	
Full test duration/performed {Y/N}	Yes	C FIGRA Threshold	
Smoke Correction Used	Yes	D FIGRA Threshold	

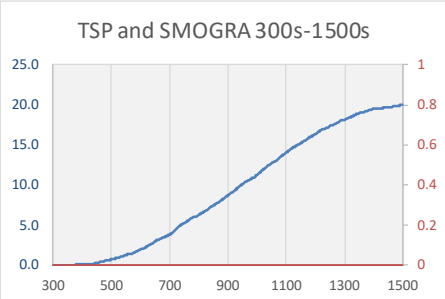




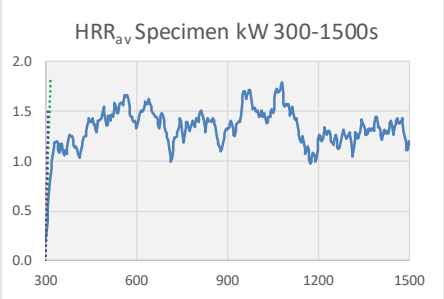


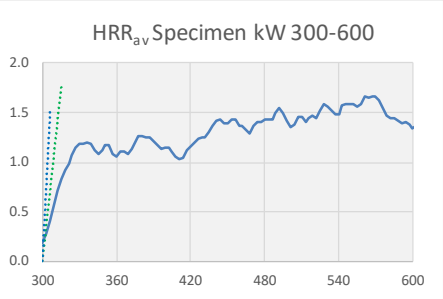


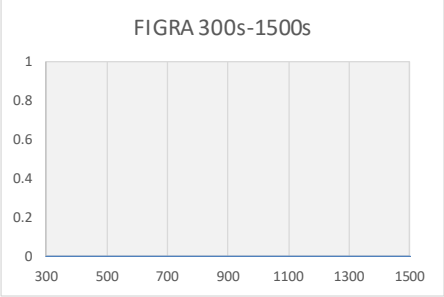


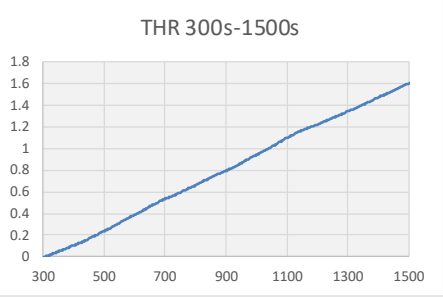


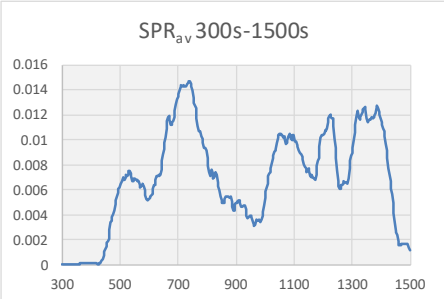
General Information		**Product**	
Product Identification	Futural coated aluminium cladding panel	Sample number	E14589
		Substrate	12 calcium silicate
Standard used	BS EN 13823	Mounting	80 mm ventilated cavity
Date of test	03/02/2023	Joints	None
Filename	s030223c.rw1		
Report reference	P122325-1003		0
		Conditioning	0
Laboratory		Conditioned	Yes
Laboratory name	BRE Global	Time interval	Held on file
Operator	C A Rock	Weight 1 (g)	Held on file
		Weight 2 (g)	Held on file
Test Results			
THR_{600}	0.79	**Additional Information**	
$FIGRA_{0.2MJ}$	0.0	Time to $FIGRA_{0.2MJ}$ (s)	#N/A
$FIGRA_{0.4MJ}$	0.0	Time to $FIGRA_{0.4MJ}$ (s)	#N/A
TSP_{600}	3.6	Time to SMOGRA (s)	#N/A
SMOGRA	0.0		
Comments			
LFSedge {Y/N}	No		
FDP (f =< 10s) {Y/N}	No	**Chart Lengend**	
FDP (f > 10s) {Y/N}	No	B FIGRA Threshold	
Full test duration/performed {Y/N}	Yes	C FIGRA Threshold	
Smoke Correction Used	Yes	D FIGRA Threshold	

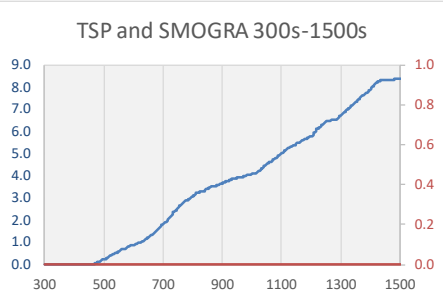




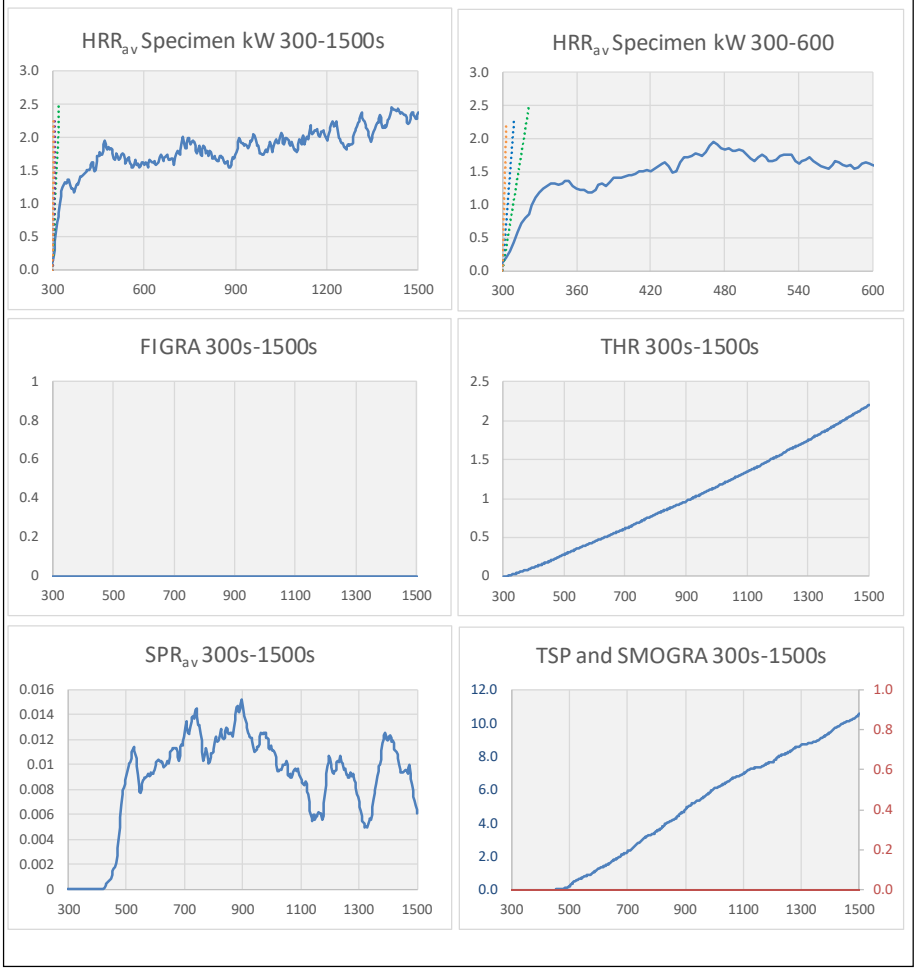








General Information		**Product**	
Product Identification	Futural coated aluminium cladding panel	Sample number	E14589
		Substrate	12 calcium silicate
Standard used	BS EN 13823	Mounting	80 mm ventilated cavity
Date of test	03/02/2023	Joints	None
Filename	s030223d.rw1		
Report reference	P122325-1003		
		Conditioning	
Laboratory		Conditioned	Yes
Laboratory name	BRE Global	Time interval	Held on file
Operator	C A Rock	Weight 1 (g)	Held on file
		Weight 2 (g)	Held on file
Test Results			
THR_{600}	0.96	**Additional Information**	
$FIGRA_{0.2MJ}$	0.0	Time to $FIGRA_{0.2MJ}$ (s)	#N/A
$FIGRA_{0.4MJ}$	0.0	Time to $FIGRA_{0.4MJ}$ (s)	#N/A
TSP_{600}	4.8	Time to SMOGRA (s)	#N/A
SMOGRA	0.0		
Comments			
LFSedge {Y/N}	No		
FDP (f =< 10s) {Y/N}	No	**Chart Lengend**	
FDP (f > 10s) {Y/N}	No	B FIGRA Threshold	
Full test duration/performed {Y/N}	Yes	C FIGRA Threshold	
Smoke Correction Used	Yes	D FIGRA Threshold	

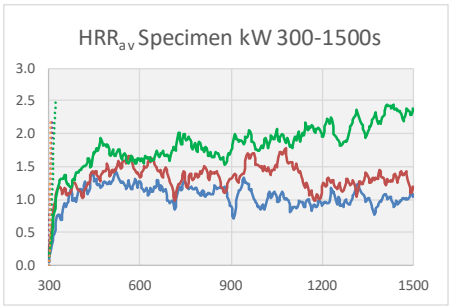


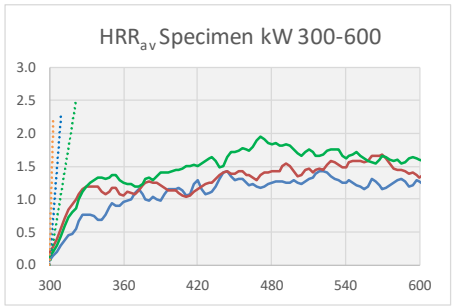
Product Identification	Futural coated aluminium cladding	Futural coated aluminium cladding	Futural coated aluminium cladding panel
Specimen number	E14494	E14589	E14589
Operator	C A Rock	C A Rock	C A Rock
Date of test	21-Oct-22	03-Feb-23	03-Feb-23
Filename	s211022c.rw1	s030223c.rw1	s030223d.rw1
THR_{600}	**0.67**	**0.79**	**0.96**
$FIGRA_{0.2MJ}$	**0.0**	**0.0**	**0.0**
$FIGRA_{0.4MJ}$	**0.0**	**0.0**	**0.0**
TSP_{600}	**8.8**	**3.6**	**4.8**
SMOGRA	**0.0**	**0.0**	**0.0**
Time of $FIGRA_{0.2MJ}$ (s)	#N/A	#N/A	#N/A
Time of $FIGRA_{0.4MJ}$ (s)	#N/A	#N/A	#N/A
LFSedge {Y/N}	N	N	N
FDP (f =< 10s) {Y/N}	N	N	N
FDP (f > 10s) {Y/N}	N	N	N
Smoke Correction Used	Yes	Yes	Yes

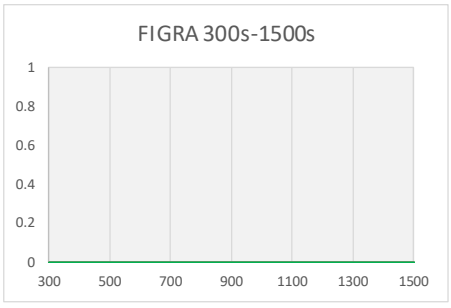
Chart Legend

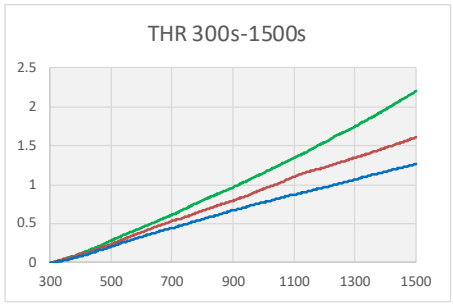
Run 1
Run 2
Run 3
B FIGRA Threshold
C FIGRA Threshold
D FIGRA Threshold

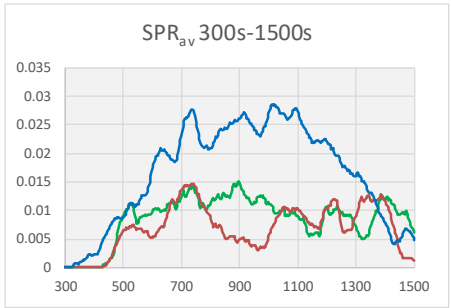
Test Averages	
THR_{600}	0.81
$FIGRA_{0.2MJ}$	0.00
$FIGRA_{0.4MJ}$	0.00
TSP_{600}	5.75
SMOGRA	0.00
LFSedge {Y/N}	N

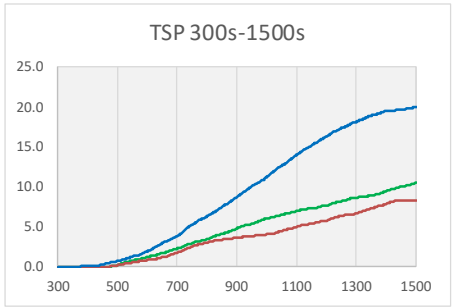












4.4 Photographs

Pre-test photographs (Run 1)


Pre-test photographs (Run 2)




Pre-test photographs (Run 3)

5 Conclusion

BS EN 13823 does not contain acceptance criteria and therefore this test report does not indicate a pass or fail of the product.

6 Validity

These test results relate to the behaviour of the sample in the form in which it was tested; the results do not necessarily relate to products produced as a result of further processing or refinement of the sample under test.

The test results relate only to behaviour of the test specimens of the product under the particular conditions of test, they are not intended to be the sole criteria for assessing the potential fire hazard of the product in use.

The information in section 2.2 and in Appendix A of this report, other than that indicated otherwise, was supplied by the test sponsor, and was not independently verified by BRE Global. The validity of the results is conditional on the accuracy of that data.

Because of the nature of reaction to fire testing and the consequent difficulty in quantifying the uncertainty of measurement of reaction to fire, it is not possible to provide a stated degree of accuracy of the results.

7 References

1 BS EN 13823: 2020. Reaction to fire tests for building products - Building products excluding floorings exposed to the thermal attack by a single burning item. BSI, London. 2020.

2 BS EN 13501-1: 2018. Fire classification of construction products and building elements. Part 1: Classification using data from reaction to fire tests. BSI, London. 2018.

Appendix A Sample description

Table A.1: Test sponsor's product description

Test sponsor
Company Name: Anhui HJ Tech Co., Ltd.
Address: #568 South Huizhou Rd.
Chuzhou City
Anhui Province
China
Postcode: 239065

Parameter		Details (if applicable)
Trade name of product		'Futural' or 'HJ TECH PVDF Pre-coated Solid Aluminium'
General description of product		PVDF pre-coated aluminium
Name and address of manufacturer of product		Anhui HJ Tech Co., Ltd. #568 South Huizhou Rd. Chuzhou City Anhui Province China
Place of manufacture		China
Product reference/number		'Futural' or 'HJ TECH PVDF Pre-coated Solid Aluminium'
Thickness		≤ 3 mm (Nominal 3 mm)
Density		2.7 g/cm³
Mass per unit area		≤ 8.1 kg/m² (Nominal 8.1)
Generic type of product		PVDF Pre-coated aluminium
Flame retardant treatment added, or organic content limited during production (yes/no), if yes give details		No
Harmonised EN product standard, and AVCP System No. if applicable		EN13501-1
Industry/in-house product standard, if applicable		Note 1
Interior facing 1 Coating	- Generic type	PVDF Paint
	- Product reference	PVDF Paint
	- Manufacturer	Note 2
	- Thickness	38 µm ± 8 µm
	- Mass per unit area/density	0.038 kg/m²
	- Colour reference	Dark Grey - high calorific colour
	- Trade name flame retardant	N/A
	- Generic type flame retardant	N/A
	- Amount flame retardant	N/A
Interior facing 2	- Generic type	Note 1
	- Product reference	Note 1
	- Manufacturer	Note 1
	- Thickness	Note 1
	- Mass per unit area/density	Note 1
	- Colour reference	Note 1
	- Trade name flame retardant	Note 1
	- Generic type flame retardant	Note 1
	- Amount flame retardant	Note 1

Test sponsor
Company Name: Anhui HJ Tech Co., Ltd.
Address: #568 South Huizhou Rd.
Chuzhou City
Anhui Province
China
Postcode: 239065

Parameter		**Details (if applicable)**
Trade name of product		'Futural' or 'HJ TECH PVDF Pre-coated Solid Aluminium'
Core material Aluminium	- Generic type - Product reference - Manufacturer - Thickness - Mass per unit area/density - Colour reference - Trade name flame retardant - Generic type flame retardant - Amount flame retardant	Aluminium Aluminium Note 2 ≤ 3 mm (Nominal 3 mm) ≤ 8.1 kg/m² (Nominal 8.1 kg/m²) Mill N/A N/A N/A
Exterior facing 2	- Generic type - Product reference - Manufacturer - Thickness - Mass per unit area/density - Colour reference - Trade name flame retardant - Generic type flame retardant - Amount flame retardant	Note 1 Note 1 Note 1 Note 1 Note 1 Note 1 Note 1 Note 1 Note 1
Exterior facing 1	- Generic type - Product reference - Manufacturer - Thickness - Mass per unit area/density - Colour reference - Trade name flame retardant - Generic type flame retardant - Amount flame retardant	Note 1 Note 1 Note 1 Note 1 Note 1 Note 1 Note 1 Note 1 Note 1
Adhesive (if applicable)	- Generic type - Product reference - Manufacturer - Application rate - Application method - Specific gravity - Colour reference - Trade name flame retardant - Generic type flame retardant - Amount flame retardant	Note 1 Note 1 Note 1 Note 1 Note 1 Note 1 Note 1 Note 1 Note 1 Note 1

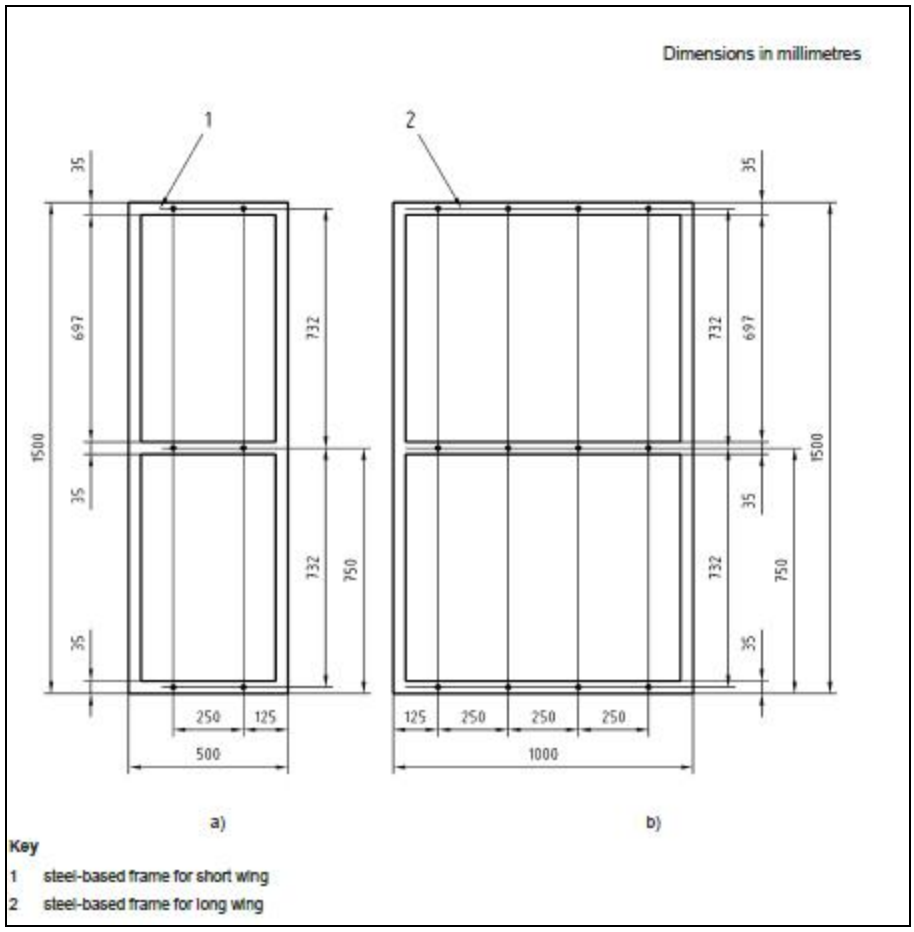
Test sponsor
Company Name: Anhui HJ Tech Co., Ltd.
Address: #568 South Huizhou Rd.
Chuzhou City
Anhui Province
China
Postcode: 239065

Parameter		**Details (if applicable)**
Trade name of product		'Futural' or 'HJ TECH PVDF Pre-coated Solid Aluminium'
Substrate (if applicable)	- Generic type	Note 1
	- Product standard	Note 1
	- Product name/reference	Note 1
	- Manufacturer	Note 1
	- Thickness	Note 1
	- Density or mass per unit area	Note 1
	- Class (EN 13501-1)	Note 1
Face to be tested		Front side
Orientation aspects		Note 1
Sampling Identification Reference		HJ001
Additional information		No

Note 1: This information was not supplied by the test sponsor.

Note 2: This commercially sensitive information has been withheld from the test report at the request of the test sponsor and is held in confidence in the BRE laboratory file.

Figure A.1: Supporting frame



Report Ends