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试 验 报 告

TEST REPORT

FEFTC

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TEST REPORT

NAME OF SPECIMEN: MPU-20 Type Single-component Polyurethane Adhesive

TYPE OF TEST: Surface Flammability Test for Surface Materials

CLIENT/MANUFACTURER: JIANGSU PROVINCE JINGJIANG CITY SPECIFIC
ADHESIVE CO., LTD

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A standard fire resistant test in accordance with IMO *THE INTERNATIONAL CODE FOR APPLICATION OF FIRE TEST PROCEDURES, 2010* (hereinafter referred to as 2010 FTP Code), Annex 1, Part 5 has been performed on the specimens of MPU-20 type single-component polyurethane adhesive at Far East Fire Testing Centre.

DATE OF TEST: March 12th, 2013

DATE OF REPORT: March 14th, 2013

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This test report may only have liability for the samples tested. The test results only concern the testing items and the Centre is not involved in the design, material, technique or performance of the product.



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1. PURPOSE OF THE TEST

To determine whether the specimens of MPU-20 type single-component polyurethane adhesive are in compliance with the relevant criteria of 2010 FTP Code Annex 1, Part 5.

2. INTRODUCTION

The test was conducted in accordance with 2010 FTP Code Annex 1, Part 5 at the request of the client. According to 2010 FTP Code Annex 1, Part 5, the specimens shall be considered as low flame-spread surface material in compliance with SOLAS Chapter II-2 if the average values of critical flux at extinguishment, heat for sustained burning, total heat release and peak heat release rate of the specimens meet the requirements for surface material and the unusual test specimen behavior during the test is eligible through the testing of three specimens.

3. DESCRIPTION OF SPECIMENS

Product information

The product was MPU-20 type single-component polyurethane adhesive produced by Jiangsu Province Jingjiang City Specific Adhesive Co., Ltd, which was mainly composed of isocyanate, polyester polyol, polyether polyol and accelerator.

Sample

The client delivered the sample to the Centre on the date March 6th, 2013.

Seal mark

The sample was submitted by the client with no seal mark on it.

3.2.3 The submitted sample was a pail of 1kg dark brown liquid.

3.3 Specimen preparation

3.3.1 The preparation of the specimens was in compliance with the requirements of Appendix 4 of 2010 FTP Code Annex 1, Part 5.

3.3.2 The adhesive was coated on the non-combustible calcium silicate boards of 800mm long × 155mm wide × 25mm thick according to the test requirements to make six specimens. The measured coating weight of the adhesive was 150g/m².

3.4 Conditioning of specimens

3.4.1 Before test, the specimens had been prepared at a temperature of 23 ± 2°C and a



relative humidity of $50 \pm 5\%$.

3.4.2 A specimen (calcium silicate board coated with adhesive) with a reference weight of 2765.3g was reweighed after an interval of 24h to be 2765.3g. The measured difference between two weighing operations was in compliance with Clause 7.7 of Appendix 1 of 2010 FTP Code Annex 1, Part 5 and achieved the requirements for conditioning of specimens.

4. TEST APPARATUS AND PROCEDURES

4.1 Before test, one specimen was mounted in the specimen holder and a calcium silicate board of 800mm long \times 155mm wide \times 10mm thick was fitted on the back of it. When testing, the side glued with MPU-20 type single-component polyurethane adhesive was placed exposure to the radiation source while the calcium silicate board was unexposed to it.

4.2 When testing, the specimen holder with the specimen was put into a standard thermal radiation environment required by 2010 FTP Code Annex 1, Part 5. The pilot flame touched the top half of the head of the specimen. The time of ignition, spread of flame and final extinguishment position of specimen were recorded during the test, the heat release rate of specimen was measured and the change as well as unusual behavior of specimen during the test were observed and recorded.

4.3 The test should be terminated when 3 minutes have passed since all flaming from the specimen ceased, or, when the specimen fails to ignite after a 10 minutes exposure.

4.4 The said specimens were tested one by one according to the procedures stated above.

5. TEST WITNESS AND ATTENDEES

There was no representative of the client or of the classification societies to come to attend the test.

6. TEST DATA AND INFORMATION

6.1 Altogether three specimens were tested in this test.

6.2 During the test, all the three specimens were ignited. The heat for sustained burning, criteria flux at extinguishment, total heat release and peak heat release rate of the three specimens were shown in Attached Tables 1 to 3.



6.3 During the test, the three specimens were observed. The observation recording was stated in Appendix 1 of the test report.

6.4 Eight photos were obtained on the test scene, with details in Appendix 2 of the test report.

Photo No.1	The submitted sample;
Photo No.2	Three specimens prior to the test;
Photo No.3	Specimen No.1 during the test;
Photo No.4	Specimen No.1 after the test;
Photo No.5	Specimen No.2 during the test;
Photo No.6	Specimen No.2 after the test;
Photo No.7	Specimen No.3 during the test;
Photo No.8	Specimen No.3 after the test.

7. TEST RESULTS

7.1 Test data

	Measured value of specimens				Allowable values
	No.1	No.2	No.3	Average values	
CFE (kW/m ²)	31.2	31.2	23.9	28.8	≥20.0
Qsb (MJ/m ²)	1.88	1.64	1.33	1.62	≥1.5
Qt (MJ)	0.12	0.07	0.12	0.10	≤0.7
Qp (kW)	0.56	0.48	0.68	0.57	≤4.0
Burning droplets (drop)	None	None	None	None	None.
Test duration (min.)	601	601	601	—	—

Where: CFE = Critical flux at extinguishment

Qsb = Heat for sustained burning

Qt = Total heat release

Qp = Peak heat release rate

7.2 Unusual test specimen behaviour did not occur.



8. CLASSIFICATION

8.1 The surface flammability test on the specimens of MPU-20 type single-component polyurethane adhesive as was described in this test report has been conducted in accordance with the relevant requirements of 2010 FTP Code Annex 1, Part 5. The test results indicate that the specimens may be regarded as low flame-spread surface material in compliance with SOLAS Chapter II-2.

8.2 Approval of the material may be obtained only on application to the appropriate Administration.

9. STATEMENT

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

TESTING IN THE CHARGE OF:



(Qian Jun)

CHECKED BY:



(Zang Hongjun)

APPROVED BY:



(Weng Xuejiang)

FAR EAST FIRE TESTING CENTRE



Attached Table 1
Heat for Sustained Burning

		Specimen 1		Specimen 2		Specimen 3	
Distance (mm)	Heat flux (kW/m ²)	Arrived time (Sec)	Heat for sustained burning (MJ/m ²)	Arrived time (Sec)	Heat for sustained burning (MJ/m ²)	Arrived time (Sec)	Heat for sustained burning (MJ/m ²)
150	47.3	34	1.61	35	1.66	18	0.85
200	42.8	42	1.80	40	1.71	29	1.24
250	38.2	49	1.87	42	1.60	37	1.41
300	31.2	71	2.22	51	1.59	48	1.50
350	23.9	—	—	—	—	68	1.63
400	19.0	—	—	—	—	—	—
450	13.6	—	—	—	—	—	—
500	10.0	—	—	—	—	—	—
550	6.3	—	—	—	—	—	—
600	4.6	—	—	—	—	—	—
650	2.7	—	—	—	—	—	—
Average of single specimen		—	1.88	—	1.64	—	1.33
Total average		1.62					

Attached Table 2
Critical Flux at Extinguishment

Specimens	The furthest distance where the flame spread to (mm)	Critical flux (kW/m ²)	Average of critical flux at extinguishment (kW/m ²)
No.1	300	31.2	28.8
No.2	300	31.2	
No.3	350	23.9	

Attached Table 3
Total Heat Release and Peak Heat Release Rate

Specimen No.	Total Heat Release Qt (MJ)	Peak Heat Release Rate (kW)
1	0.12	0.56
2	0.07	0.48
3	0.12	0.68
Average	0.10	0.57



**APPENDIX 1
OBSERVATION**

Time		Conditions and Results
Min.	s.	
Heat flux was stabilized and prepare for specimen No.1.		
00	00	Specimen No.1 was mounted in the specimen holder and was put into the thermal radiation environment. Test began.
00	08	The front of specimen smoked.
00	25	The front of specimen at 100mm position fired, and the flame spread.
00	34	The flame spread to the position 150mm.
00	42	The flame spread to the position 200mm.
00	49	The flame spread to the position 250mm.
01	11	The flame spread to the position 300mm.
01	45	Flame on specimen had extinguished thoroughly with the flame reaching as far as 300mm.
02	51	The specimen 0-400mm presented char black color.
10	01	There was no new flame on specimen. Test on specimen 1 stopped.
		Unusual test specimen behaviour: none;
Heat flux was stabilized and prepare for specimen No.2.		
00	00	Specimen No.2 was mounted in the specimen holder and was put into the thermal radiation environment. Test began.
00	10	The front of specimen smoked.
00	28	The front of specimen at 100mm position fired, and the flame spread.
00	35	The flame spread to the position 150mm.
00	40	The flame spread to the position 200mm.
00	42	The flame spread to the position 250mm.
00	51	The flame spread to the position 300mm.
01	13	Flame on specimen had extinguished thoroughly with the flame reaching as afar as 300mm.
02	00	Specimen 0-400mm presented char black color.
10	01	There was no new flame on specimen. Test on specimen 2 stopped.
		Unusual test specimen behaviour: none;
Heat flux was stabilized and prepare for specimen No.3.		
00	00	Specimen No.3 was mounted in the specimen holder and was put into the thermal radiation environment. Test began.
00	08	The front of specimen smoked.
00	18	Specimen 0-150mm fired, and the flame spread.
00	29	The flame spread to the position 200mm.
00	37	The flame spread to the position 250mm.
00	48	The flame spread to the position 300mm.
01	08	The flame spread to the position 350mm.
01	22	Flame on specimen had extinguished thoroughly with the flame reaching as far as 350mm.
02	10	Specimen 0-400mm presented char black color.
10	01	There was no new flame on specimen. Test on specimen 3 stopped.
		Unusual test specimen behaviour: none;
As the situation requiring additional test did not occur in the test duration of the three specimens, the whole group of test ended.		

