Test report no.: **109478/14**

Customer:
HANWHA L&C
Hanwha Building 1
Janggyo-Dong Chung-Gu
100-797 SEOUL
KOREA

Order:
Testing of the heating of laminated profile surfaces upon exposure to an artificial radiation source according to the test procedure draft "Testing of the heating of coloured profile surfaces upon exposure to an artificial radiation source" of 16 September 2008.

Email dated: 2014-01-15 **Ref:** Mr Park

Sample receipt: 2014-01-17

Test period: 2014-01-22 to 2014-01-29

This test report consists of 5 pages.

Würzburg, 2014-02-19
Rs/ste

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Dr. Anton Zahn

International akkreditiert
SKZ - TeConA GmbH

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The original language of the report is German. In case of doubt, the German version is obligatory.

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SKZform 1020 - 12/13

1. Order

The Company HANWHA L&C, Hanwha Building 1, Janggyo-Dong Chung-Gu, 100-797 SEOUL, KOREA, instructed the SKZ - TeConA GmbH on 15 January 2014 to test the heating of laminated profile surfaces upon exposure to an artificial radiation source according to the test procedure draft "Testing of the heating of coloured profile surfaces upon exposure to an artificial radiation source" of 16 September 2008.

2. Test material

On 17 January 2014 SKZ - TeConA GmbH received following samples for testing:

5 DIN A4 sections of each décor.

Designation of the foils according to manufacturers data or suppliers data:

Sample no.	Designation of foil
1	**HM1DW**
2	**HM1MG**

Sample 1: HM1DW **Sample 2: HM1MG**

3. Test procedure

The tests described in the following have been performed in accordance with the test procedure draft "Testing of the heating of coloured profile surfaces upon exposure to an artificial radiation source" of 16 September 2008.

The test procedures was carried out according to standard climate 23/50, class 1 according to DIN EN ISO 291: 2008-08.

Usually we carry out tests according to standards for which we have an accreditation. The list of all standards for which we are accredited is shown on the homepage at www.skz.de .

The test was predominantly effected as double determination on black base body and as double determination on white base body.

Non-black pigmented PVC-U plates with L*>92 have been used as white base bodies and homogeneous black PVC-U plates with a carbon black content of 0.5 % +/- 0.1 % have been used as black base bodies.

The foils have been applied by means of a double-faced adhesive tape "HDK7408" of company Hohner-Industrietechnik without causing bubbles.

The radiation was implemented by means of a dim IR radiator Siccatherm "Sicca FR 250W HG".

The foils indicated under item 2. has been tested.

4. Test results

Determination on black base body

HM1DW					
	Sample 1	°C		Sample 2	°C
1	$T_{black\ reference\ sample\ (prior\ to\ measuring)}$	74.0		$T_{black\ reference\ sample\ (prior\ to\ measuring)}$	74.0
	$T_{black\ reference\ sample\ (after\ measuring)}$	73.6		$T_{black\ reference\ sample\ (after\ measuring)}$	73.6
	$T_{white\ reference\ sample}$	53.2		$T_{white\ reference\ sample}$	53.2
	T_{room}	23.0		T_{room}	23.0
	ΔT	7.1		ΔT	7.4
	T_{sample}	**66.7**		**T_{sample}**	**66.4**

HM1MG					
	Sample 1	°C		Sample 2	°C
2	$T_{black\ reference\ sample\ (prior\ to\ measuring)}$	73.8		$T_{black\ reference\ sample\ (prior\ to\ measuring)}$	73.8
	$T_{black\ reference\ sample\ (after\ measuring)}$	74.0		$T_{black\ reference\ sample\ (after\ measuring)}$	74.0
	$T_{white\ reference\ sample}$	53.0		$T_{white\ reference\ sample}$	53.0
	T_{room}	23.3		T_{room}	23.3
	ΔT	4.9		ΔT	4.5
	T_{sample}	**69.0**		**T_{sample}**	**69.4**

Determination on white base body

HM1DW					
	Sample 1	°C		Sample 2	°C
1	$T_{black\ reference\ sample\ (prior\ to\ measuring)}$	74.0		$T_{black\ reference\ sample\ (prior\ to\ measuring)}$	74.0
	$T_{black\ reference\ sample\ (after\ measuring)}$	73.6		$T_{black\ reference\ sample\ (after\ measuring)}$	73.6
	$T_{white\ reference\ sample}$	53.2		$T_{white\ reference\ sample}$	53.2
	T_{room}	23.0		T_{room}	23.0
	ΔT	10.1		ΔT	10.1
	T_{sample}	**63.7**		**T_{sample}**	**63.7**

HM1MG					
	Sample 1	°C		Sample 2	°C
2	$T_{black\ reference\ sample\ (prior\ to\ measuring)}$	73.8		$T_{black\ reference\ sample\ (prior\ to\ measuring)}$	73.8
	$T_{black\ reference\ sample\ (after\ measuring)}$	74.0		$T_{black\ reference\ sample\ (after\ measuring)}$	74.0
	$T_{white\ reference\ sample}$	53.0		$T_{white\ reference\ sample}$	53.0
	T_{room}	23.3		T_{room}	23.3
	ΔT	5.1		ΔT	5.6
	T_{sample}	**68.8**		**T_{sample}**	**68.3**

Summary

Sample	T_{sample} on black	T_{sample} on white
HM1DW	67 °C	64 °C
HM1MG	69 °C	69 °C