TEST REPORT

No. : SHIN2006034295CM
Date : Jul 09, 2020

CUSTOMER NAME: POLILAM NEW MATERIAL CO., LTD
ADDRESS:

Sample Name	:	ACE SURFACE
Thickness	:	1.0mm
Specification	:	1220*2440
Density	:	1400Kg/m^3
Material	:	Paper, resin
Sampletesting surface	:	front

Above information and sample(s) was/were submitted and confirmed by the client. SGS, however, assumes no responsibility to verify the accuracy, adequacy and completeness of the sample information provided by client.

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Test Required	:	Please see the next page(s)
SGS Ref. No.	:	SHRS20060165
Ref. Standard	:	Please see the next page(s)
Date of Receipt	:	Jun 12, 2020
Testing Start Date	:	Jun 12, 2020
Testing End Date	:	Jul 09, 2020
Test Result(s)	:	For further details, please refer to the following page(s) (Unless otherwise stated the Results shown in this test report refer only to the sample(s) tested)

Signed for
SGS-CSTC Standards Technical Service (Shanghai)Co., Ltd.

Erin Huang
Authorized signatory

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TEST REPORT

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Summary of Results:

No.	Test Item	Test Method	Result	Conclusion
1	Resistance to Abrasion	EN 438-2:2016+A1:2018 Clause 10	See Result	/
2	Resistance to Immersion in Boiling Water	EN 438-2:2005 Clause 12	See Result	/
3	Resistance to Water Vapour	EN 438-2:2016+A1:2018 Clause 14	See Result	/
4	Resistance to Dry Heat	EN 438-2:2016+A1:2018 Clause 16	See Result	/
5	Dimensional Stability at Elevated Temperature	EN 438-2:2016+A1:2018 Clause 17	See Result	/
6	Resistance to Wet Heat	EN 438-2:2016+A1:2018 Clause 18	See Result	/
7	Resistance to Impact by Large Diameter Ball	EN 438-2:2016+A1:2018 Clause 21	See Result	/
8	Resistance to Cracking under Stress	EN 438-2:2016+A1:2018 Clause 23	See Result	/
9	Scratch Resistance	EN 438-2:2016+A1:2018 Clause 25	See Result	/
10	Resistance to Staining	EN 438-2:2016+A1:2018 Clause 26	See Result	/
11	Density	EN ISO 1183-1:2019 Method A	See Result	/
12	Gloss	ISO 2813:2014	See result	/
13	Resistance to Artificial Weathering	EN 438-2:2016+A1:2018 Clause 29	See result	/
14	Resistance to impact by small-diameter ball	EN 438-2:2016+A1:2018 Clause 20	See result	/

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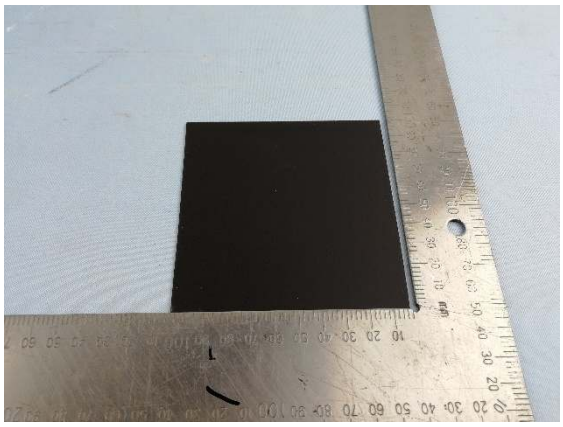
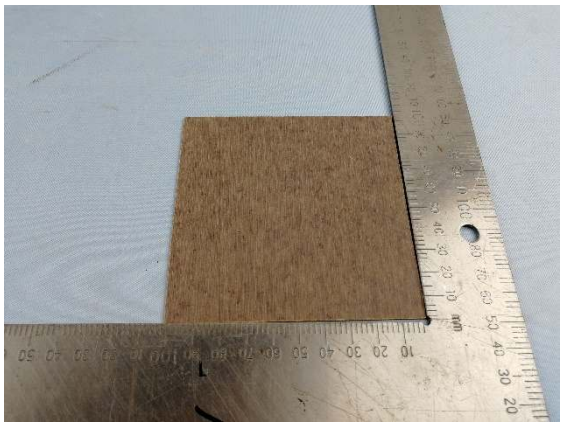
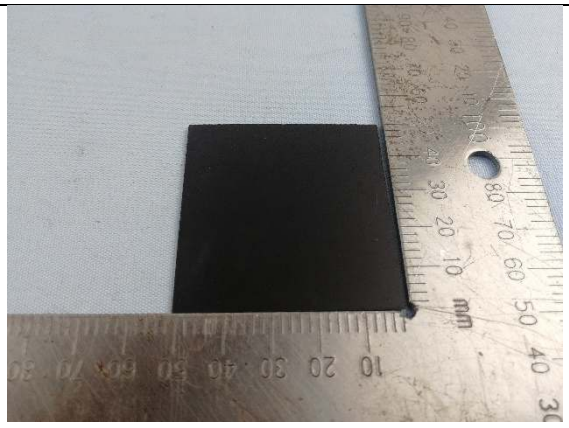
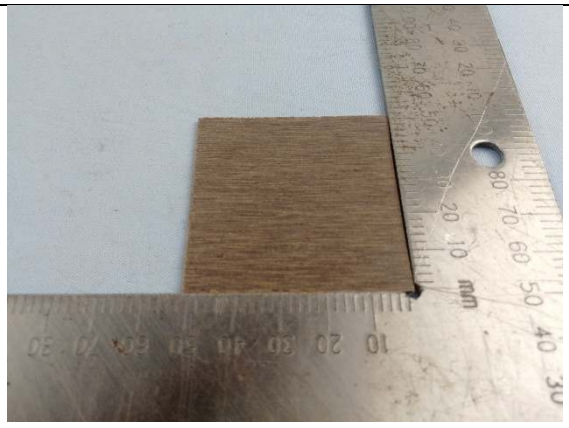
Note: Pass : Meet the requirements;
Fail : Does not meet the requirements;
/ : Not Apply to the judgment.

Original Sample Photo(s):

	
Resistance to Abrasion / Resistance to Water Vapour / Scratch Resistance / Resistance to Staining / Density – Front	Resistance to Abrasion / Resistance to Water Vapour / Scratch Resistance / Resistance to Staining / Density – Back
	
Resistance to Immersion in Boiling Water – Front	Resistance to Immersion in Boiling Water – Back

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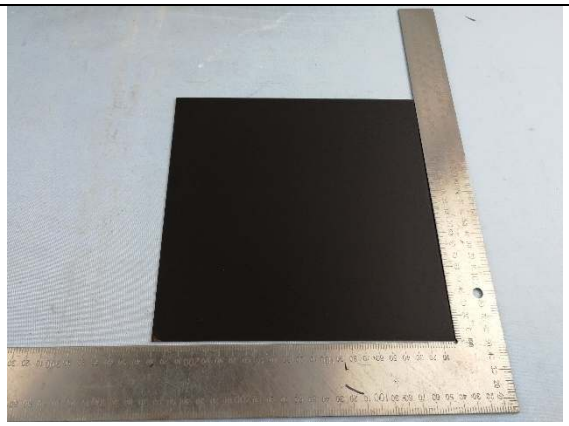
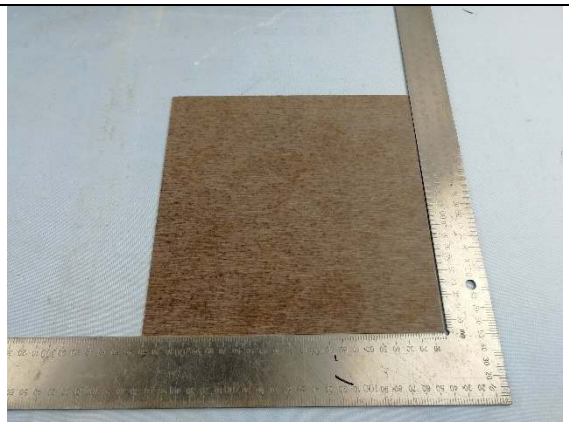
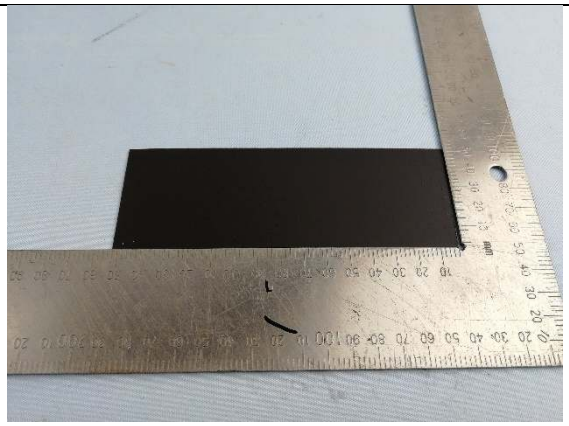
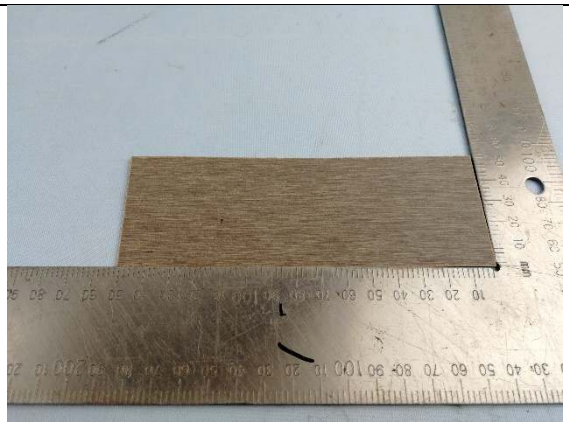
	
Resistance to Dry Heat / Dimensional Stability at Elevated Temperature / Resistance to Wet Heat / Resistance to Impact by Large Diameter Ball – Front	Resistance to Dry Heat / Dimensional Stability at Elevated Temperature / Resistance to Wet Heat / Resistance to Impact by Large Diameter Ball – Back
	
Resistance to Cracking under Stress – Front	Resistance to Cracking under Stress – Back

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TEST REPORT

1. Test Item: Resistance to Abrasion

Test Method: EN 438-2:2016+A1:2018 Clause 10

Test Condition:

Specimen: 100mm×100mm×1.0mm, 3pcs

Lab Environment Condition: 23±2℃, 50±5%RH

Test Result:

Test Item	Test Result			
	Ind.			Ave.
Resistance to Abrasion – IP value (r)	550	600	600	600

2. Test Item: Resistance to Immersion in Boiling Water

Test Method: EN 438-2:2016+A1:2018 Clause 12

Test Condition:

Specimen: 50mm×50mm×1.0mm, 3pcs

Test Condition: Immersion in boiling water for 2h→ immersion in cooling water (23℃) for 15min.

Lab Environment Condition: 23±2℃, 50±5%RH

Test Result:

Test Item		Test Result			
		Individual value			Average value
Resistance to Immersion in Boiling Water	Percentage increase in mass (%)	2.8	2.9	3.0	2.9
	Percentage increase in thickness (%)	2.6	3.1	2.5	2.9
		3.1	3.0	3.3	
		3.1	2.8	2.9	
		2.5	2.8	3.0	
	Surface rating scale*	Rating 5	Rating 5	Rating 5	/
	Edge rating scale*	Rating 5	Rating 5	Rating 5	/

Note: According to EN 438-2:2016+A1:2018 Clause 12.5.2 & Clause 12.5.3 rating scale as follow:

*Surface rating scale:

Rating 5: No visible change

Rating 4: Slight change of gloss and/or colour, only visible at certain viewing angles

Rating 3: Moderate change of gloss and/or colour

Rating 2: Marked change of gloss and/or colour or surface blistering

Rating 1: Surface layers delamination

*Edge rating scale:

Rating 5: No visible change

Rating 4: Slight hairline edge cracks visible to the naked eyes

Rating 3: Moderate edge cracks

Rating 2: Severe edge cracks

Rating 1: Core layers delamination

TEST REPORT

3. Test Item: Resistance to Water Vapour

Test Method: EN 438-2:2016+A1:2018 Clause 14

Test Condition:

Specimen: 100mm×100mm×1.0mm, 1pc

Test time: 1h

Test water: Boiling water

Lab Environment Condition: 23±2℃, 50±5%RH

Test Result:

Test Item	Test Result
Resistance to Water Vapour	Rating 5

Note: According to EN 438-2:2016+A1:2018 Clause 14.5 rating scale as follow:

Expression of Results:

Rating 5: No visible change

Rating 4: Slight change of gloss and/or colour, only visible at certain viewing angles

Rating 3: Moderate change of gloss and/or colour

Rating 2: Marked change of gloss and/or colour

Rating 1: Blistering and/or delamination

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TEST REPORT

4. Test Item: Resistance to Dry Heat

Test Method: EN 438-2:2016+A1:2018 Clause 16

Test Condition:

Specimen: 230mm×230mm×1.0mm, 1pc

Test temperature: 160℃

Lab Environment Condition: 23±2℃, 50±5%RH

Test Result:

Test Item	Test Result
Resistance to Dry Heat	Rating 5

Rating scale:

Rating scale	Description
5	No change Test area indistinguishable from adjacent surrounding area
4	Minor change Test area distinguishable from adjacent surrounding area, only when the light source is mirrored on the test surface and is reflected towards the observer's eye, e.g. discoloration, change in gloss and colour
3	Moderate change Test area distinguishable from adjacent surrounding area, visible in several viewing directions, e.g. discoloration, change in gloss and colour, no change in the surface structure, e.g. deformation, cracking, blistering
2	Significant change Test area clearly distinguishable from adjacent surrounding area, visible in all viewing directions, e.g. discoloration, change in gloss and colour, and/or structure of the surface slightly changed, e.g. slight cracking, slight blistering
1	Strong change The structure of the surface being distinctly changed e.g. strong cracking, strong blistering and/or discoloration, change in gloss and colour, and/or the surface material being totally or partially delaminated

5. Test Item: Dimensional Stability at Elevated Temperature

Test Method: EN 438-2:2016+A1:2018 Clause 17

Test Condition:

Specimen: 200mm×50mm×0.6mm, 8pcs (4pcs for each direction)

Dry heat test: 70℃, 24h

High humidity test: 40℃, 93%RH, 96h

Lab Environment Condition: 23±2℃, 50±5%RH

Test Result:

Test Item			Test Result		
			Ind.		Ave.
Dimensional Sability at Eevated Tmperature (%)	Dry heat test	Mechanical direction	-0.15	-0.16	-0.16
		Across-mechanical direction	-0.28	-0.29	-0.28
	High humidity test	Mechanical direction	0.06	0.06	0.06
		Across-mechanical direction	0.14	0.14	0.14

Note: Test specimens was cut from original sample.

6. Test Item: Resistance to Wet Heat

Test Method: EN 438-2:2016+A1:2018 Clause 18

Test Condition:

Specimen: 230mm×230mm×1.0mm, 1pc

Test temperature: 100℃

Lab Environment Condition: 23±2℃, 50±5%RH

Test Result:

Test Item	Test Result
Resistance to Wet Heat	Rating 5

Rating scale:

Rating scale	Description
5	No change Test area indistinguishable from adjacent surrounding area
4	Minor change Test area distinguishable from adjacent surrounding area, only when the light source is mirrored on the test surface and is reflected towards the observer's eye, e.g. discoloration, change in gloss and colour
3	Moderate change Test area distinguishable from adjacent surrounding area, visible in several viewing directions, e.g. discoloration, change in gloss and colour, no change in the surface structure, e.g. deformation, cracking, blistering
2	Significant change Test area clearly distinguishable from adjacent surrounding area, visible in all viewing directions, e.g. discoloration, change in gloss and colour, and/or structure of the surface slightly changed, e.g. slight cracking, slight blistering
1	Strong change The structure of the surface being distinctly changed e.g. strong cracking, strong blistering and/or discoloration, change in gloss and colour, and/or the surface material being totally or partially removed

7. Test Item: Resistance to Impact by Large Diameter Ball

Test Method: EN 438-2:2016+A1:2018 Clause 21

Test Condition:

Specimen: 230m×230m×1.0mm, 5pcs

Steel ball diameter: 42.8mm,

Steel ball weight :324g

Lab Environment Condition: 23±2℃, 50±5%RH

Test Result:

Test Item	Test Result
Resistance to Impact by Large Diameter Ball	2200mm, No cracking

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8. Test Item: Resistance to Cracking under Stress

Test Method: EN 438-2:2016+A1:2018 Clause 23

Test Condition:

Specimen: 150mm×50mm×1.0mm, 3pcs

Test temperature: 50℃, 6h

Lab Environment Condition: 23±2℃, 50±5%RH

Test Result:

Test Item	Test Result
Resistance to Cracking under Stress	Rating 5

Rating scale:

Rating 5: No evidence of cracking

Rating 4: Hairline cracks only visible under ×6 magnification

Rating 3: Cracks visible with normal vision (corrected if necessary) from the edge of the hole, but not extending to either edge of the specimen

Rating 2: A crack visible with normal vision (corrected if necessary) from the edge of the hole, extending to one edge of the specimen such that the specimen is not broken into two pieces

Rating 1: Specimen broken into two pieces

9. Test Item: Scratch Resistance

Test Method: EN 438-2:2016+A1:2018 Clause 25

Test Condition:

Specimen: 100mm×100mm×1.0mm, 1pc

Rubbing stylus: Hemispherical diamond scratching point of radius (0.09±0.003)mm and an included angle of (90 ± 1) °

Rotational frequency: (5±1) min^{-1}

Lab Environment Condition: 23±2℃, 50±5%RH

Test Result:

Test Item	Test Result
Scratch Resistance	Rating 4

Note: According to EN 438-2:2016+A1:2018 table 6 rating scale as follow:

Rating	Discontinuous scratches, or faint superficial marks, or no visible marks	≥90% continuous double circle of scratch marks clearly visible
Rating 5	6N	>6N
Rating 4	4N	6N
Rating 3	2N	4N
Rating 2	1N	2N
Rating 1	-	1N

TEST REPORT

10. Test Item: Resistance to Staining

Test Method: EN 438-2:2016+A1:2018 Clause 26

Test Condition:

Specimen: 100mm×100mm×1.0mm, 5pcs

Lab Environment Condition: 23±2℃, 50±5%RH

Test Result:

Test Item		Test Result
Resistance to Staining	Acetone	Rating 5
	120g/L Coffee	Rating 5
	25% Sodium hydroxide	Rating 5
	30% Hydrogen peroxide	Rating 5
	Carbon black suspension in paraffin oil (Shoe polish simulant)	Rating 5

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Rating code:

Numerical rating	Description
5	No change Test area indistinguishable from adjacent surrounding area
4	Minor change Test area distinguishable from adjacent surrounding area, only when the light source is mirrored on the test surface and is reflected towards the observer's eye, e.g. discoloration, change in gloss and colour
3	Moderate change Test area distinguishable from adjacent surrounding area, visible in several viewing directions, e.g. discoloration, change in gloss and colour
2	Significant change Test area clearly distinguishable from adjacent surrounding area, visible in all viewing directions, e.g. discoloration, change in gloss and colour, and/or structure of the surface slightly changed, e.g. cracking, blistering
1	Strong change The structure of the surface being distinctly changed and/or discoloration, change in gloss and colour, and/or surface material being totally or partially delaminated

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11. Test Item: Density

Test Method: EN ISO 1183-1:2019 Method A

Test Condition:

Specimen: 100mm×100mm×1.0mm, 5pcs

Water temperature:23℃

Lab Environment Condition: 23±2℃, 50±5%RH

Test Result:

Test Item	Test Result					
	Ind.					Ave.
Density (g/cm^3)	1.40	1.39	1.38	1.40	1.40	1.39

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No. : SHIN2006034295CM
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12. Test Item: Gloss

Test Method: ISO 2813:2014

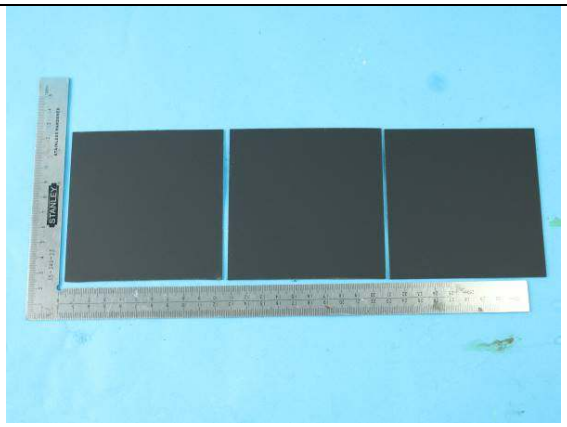
Test Condition:

Geometry: 20° /60° /85°

Test Result:

Sample	Geometry		
	20°	60°	85°
A	0.2	1.6	9.7

Test Photo:



Test sample

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TEST REPORT

13. Test item: Resistance to Artificial Weathering

Test Method: EN 438-2:2016+A1:2018 Section 29

Test Condition:

Exposure cycle:

Irradiance: (0.50±0.03)W/(m^2·nm)@340nm

(102±0.5) min light at (65±3)℃ BST, (65±10)%RH

(18±0.5) min light and water spray

Filter: Boro/Boro

Exposure period: Blue wool reference 6 faded to grey scale 4

Test result(s):

Sample	Grey scale (See note 1)	Appearance rating (See note 2)
1	4-5	5

Note:

1. According to DIN EN 20105-A02:1994, Grey scale is determined under D65 standard light, grade 5 is the best and grade 1 is the worst.
2. According to EN 438-2:2016 section 29.5.3, rating 5 is the best and rating 1 is the worst.
3. Remove the test specimen from the apparatus and leave it for (24 ± 2) h in dark conditions in the conditioning chamber.

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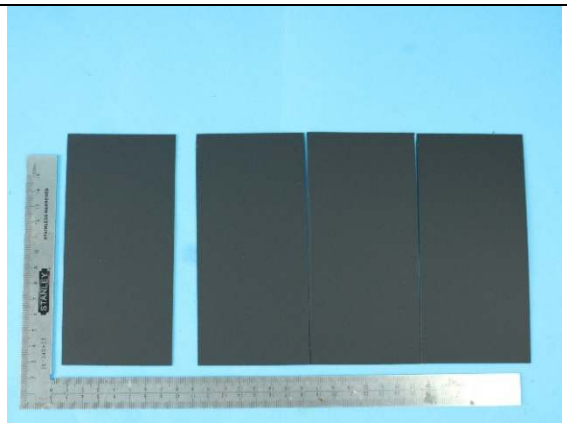
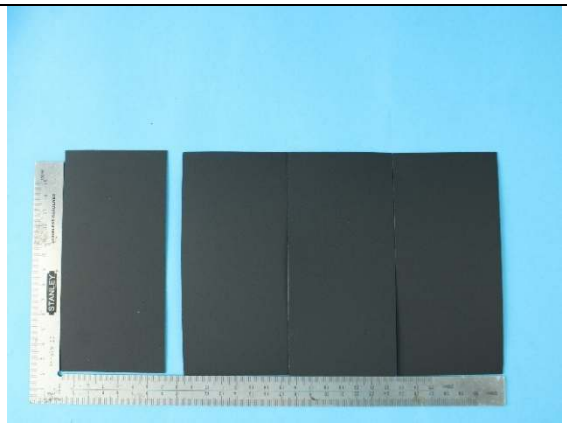
Test Photo:

	
Reference sample Test sample Before test	Reference sample Test sample After test

14. Test item: Resistance to impact by small-diameter ball

Test method: EN 438-2:2016+A1:2018 Clause 20

Test result:

Test Property	Test procedures/requirements	Rating/ Result
Resistance to impact by small-diameter ball	1. The test shall be carried out in the laboratory atmosphere. 2. Place the steel plate on a convenient rigid horizontal surface and locate the specimen on it with its decorative surface uppermost. Fix the impact tester in its support fixture, load the tester, place the assembly on the specimen and release the impact bolt. Start preliminary test with a spring force of 10 N and increase by 5 N on each occasion to determine the minimum spring force at which the surface of the specimen shows damage due to impact stress. 3. Test further specimens for the final determination of the maximum force at which no damage occurs. For this purpose, start with the spring force determined in the preliminary test and reduce it in suitable stages, for example 1 N, after every five strikes. 4. To make any damage more easily visible, the surface of the specimen shall be rubbed with a contrast medium after the test. 5. The distance between points of impact shall be at least 20 mm and between points of impact and the edge of the specimen at least 30 mm. 6. Examine the surface tested for damage at the points of impact. For the purpose of this test, damage is defined by the presence of fine hairline cracks (which are frequently concentric), continuous cracks or flaking of the decorative surface. Indentations without cracks do not count as damage.	Max resistance to impact force: 44N

TEST REPORT

Test Property	Test procedures/requirements	Rating/ Result
	7. If the test is conducted only to determine whether the impact strength of a material exceeds a limiting value, the specimen shall sustain no damage after five successive individual impact strikes with the prescribed spring force. Expression of results 1. The impact resistance of the laminate under test is the maximum value of the spring force, in Newtons, for which no damage occurs in a series of five strikes. 2. To prove compliance with a specified limit value it is only necessary to carry out the test at the specified force.	

******** End of report********

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