**Test Report** Number: GZHH00301510

Applicant: ZHEJIANG HOYTECH CO., LTD.
LIULI INDUSTRIAL PARK, GANPU TOWN,
HAIYAN COUNTY, JIAXING CITY,
ZHEJIANG PROVINCE

Date: Nov 12, 2018

Sample Description:
Six (6) pieces of submitted sample said to be :
Item Name : **Loose Lay Pvc Flooring**
Date Sample Received : Oct 17, 2018

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Tests conducted:
As requested by the applicant, refer to attached page(s) for details.
**********

To be continued

Authorized by:
For Intertek Testing Services Shenzhen Ltd.
Guangzhou Branch, Hardlines

Ben N.L. Lin
General Manager



**Intertek Testing Services Shenzhen Limited, Guangzhou Branch**
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广州高新技术开发区科学城光谱西路 69 号 TCL 文化产业园汇创空间 111/广州经济技术开发区科学城彩频路 7 号之二 E501(510663)

Tel +8620 8213 9688
Fax +8620 3205 3537
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Conclusion:

| Tested sample | Test item | Result |
|---|---|---|
| Submitted samples | Performance Test for Loose Lay PVC Flooring<br>- As per ASTM F1700-18a<br>Section 6.2 Size<br>Section 6.3.1 Thickness<br>Section 6.3.2 Wear Layer<br>Section 6.4 Squareness<br>Section 6.6 Flexibility<br>Section 6.7 Dimensional Stability<br>Section 6.10 Resistance to Light | Pass |
| | Wear Resistance Test for Loose Lay PVC Flooring<br>- As per ASTM F510/F510M-14 | See test conducted |
| | Coefficient Of Friction Test for Loose Lay PVC Flooring<br>- As per ASTM D2047-2011 | See test conducted |
| | Smoke Density Rating for Loose Lay PVC Flooring<br>- As per ASTM D2843-164. | See test conducted |
| | Critical Radiant Flux for Loose Lay PVC Flooring<br>- As per ASTM E648-17 | See test conducted |
| | Impact Sound Transmission Test for Loose Lay PVC Flooring<br>- As per ASTM E989-06 and ASTM E2179-03 | See test conducted |
| | Standard | |
| Tested components of submitted samples | U.S. ASTM F963-17 on soluble heavy elements test | See comment |
| | US Consumer Product Safety Improvement Act 2008 Title I, Sec 108 requirement on phthalate | See comment |

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Comment: The testing scope of the following standard was not applicable to the submitted samples. However, the test results of the samples met the related requirements as stated in this report.

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Tests Conducted

1 Performance Test for Loose Lay PVC Flooring

As per ASTM F1700-18a Standard Specification for Solid Vinyl Floor Tile, the tested samples were subjected to the following tests.

Nominal size: 1219.2 mm X 228.6 mm X 5.2 mm

Initial inspection: No any damage was found

Executive summary:

| No. | Test item | Test parameter | Test result | Verdict |
|---|---|---|---|---|
| 1 | Size | Test method: As per ASTM F1700-18a Section 6.2 and ASTM F2055-2017<br>Nominal size: 1219.2mm ×228.6mm ×5.2mm<br>Requirement of ASTM F1700-18a: A tolerance of ±0.016 in. (0.4 mm) per linear ft (305 mm) shall be permitted. | Tolerance of width direction:<br>0.08 mm per linear ft;<br>Tolerance of length direction:<br>0.08 mm per linear ft | Pass |
| 2 | Thickness | Test method: As per ASTM F1700-18a Section 6.3.1 and ASTM F386-2017<br>Nominal thickness: 5.2mm<br>Requirement of ASTM F1700-18a: A tolerance of ±0.005 in. (0.13 mm) shall be permitted. | Ave. thickness:<br>5.21 mm<br>Maximun deviation:<br>0.04mm | Pass |
| 3 | Wear Layer | Test method: As per ASTM F1700-18a Section 6.3.2 and ASTM F410-08(2017)<br>Specimen: 50×10mm | 0.54 mm | -- |
| 4 | Squareness | Test method: As per ASTM F1700-18a Section 6.4 and ASTM F2055-2017<br>Nominal size: 1220×228mm<br>Requirement of ASTM F1700-18a: The out-of-squareness of the tile shall not exceed 0.010 in. (0.25 mm). | 0.0mm | Pass |

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Tests Conducted

| No. | Test item | Test parameter | Test result | Verdict |
|---|---|---|---|---|
| 5 | Flexibility | Test method: As per ASTM F1700-18a Section 6.6 and ASTM F137-08(2018)<br>Specimen: 200×50mm<br>Mandrel size: 25.4mm<br>Requirement of ASTM F1700-18a: When tested by a mandrel size of 1 in. (25.4 mm), the tile shall show no cracks or breaks. | No visible damage | Pass |
| 6 | Dimensional Stability | Test method: As per ASTM F1700-18a Section 6.7 and ASTM F2199-2018<br>Specimen: 305×228mm<br>Condition: 82±2℃, 6h→23±2℃, 50±5%RH, 24h<br>Requirement of ASTM F1700-18a: The tile shall not change in linear dimensions more than 0.5 mm per linear ft. | Width direction: 0.15 mm per linear ft; Length direction: 0.40 mm per linear ft | Pass |
| 7 | Resistance to Light | Test method: As per ASTM F1700-18a Section 6.10 and ASTM F1515-2015<br>Specimen: 50×50mm<br>Exposure time: 300h<br>Requirement of ASTM F1700-18a:The color change of the solid vinyl tile shall have an average ΔE not greater than 8.0 after a 300h exposure | ΔE=0.32 | Pass |

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**intertek.com**

Tests Conducted

2 Wear Resistance Test for Loose lay PVC Flooring

As per ASTM F510/F510M-14 Standard Specification for Solid Vinyl Floor Tile, the tested samples were subjected to the following tests.

Initial inspection: No any damage was found

Executive summary:

| No. | Test Item | Test Method | Test Result |
|---|---|---|---|
| 1 | Wear Resistance | ASTM F510/F510M-14 | Volume loss per 100 revolutions: 1.1mm$^3$ |

3 Coefficient Of Friction Test for Loose lay PVC Flooring

As per ASTM D2047-2011 Standard Specification for Solid Vinyl Floor Tile, the tested samples were subjected to the following tests.

Initial inspection: No any damage was found

Executive summary:

Static Coefficient Of Friction For Polish-Coated Flooring back layer(black) (ASTM D2047-2011, 23±2 ℃, 50 ± 5% R.H.):

Standard Leather:

| | |
|---|---|
| The Mean Of Static Coefficient Of Frication: | |
| Dry: | 0.34 |
| Wet: | 0.64 |

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Tests Conducted

4 Density of Smoke from the Burning or Decomposition of Plastics

As per ASTM D2843-16, the tested samples were subjected to the following tests.
Test parameter: test sample was placed on supporting metal screen and burned in a laboratory test chamber under active flame conditions using a propane burner operating at a pressure of 276 kPa (40 psi). The 300 by 300 by 790-mm (12 by 12 by 31-in.) test chamber is instrumented with a light source, photoelectric cell, and meter to measure light absorption horizontally across the 300-mm (12-in.) light beam path. The chamber is closed during the 4-min test period except for the 25-mm (1-in.) high ventilation openings around the bottom. the maximum smoke produced and the smoke-density rating were recorded.

Sample description: Loose Lay PVC Flooring
Sample size: 1219.2 mm X 228.6 mm X 5.2 mm
Initial inspection: No any damage was found

Test result:

| No. | Test Item | Test Method | Test Result |
|---|---|---|---|
| 1 | Smoke Density Rating | ASTM D2843-16 | 65.04 |

5 Critical Radiant Flux for Loose lay PVC Flooring

As per ASTM E648-17 Standard Specification for Solid Vinyl Floor Tile, the tested samples were subjected to the following tests.

Initial inspection: No any damage was found

Executive summary:

| No. | Test Item | Test Method | Test Result |
|---|---|---|---|
| 1 | Critical Radiant Flux | ASTM E648-17 | 0.64 W/cm² |

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Fax +8620 3205 3537
**intertek.com.cn**
**intertek.com**

Tests Conducted

6 Impact Sound Transmission Test for Loose lay PVC Flooring

As per ASTM E989-06 and ASTM E2179-03 Standard Specification for Solid Vinyl Floor Tile, the tested samples were subjected to the following tests.

Initial inspection: No any damage was found

Executive summary:

Preconditioning: At a temperature of (23±2)℃ and relative humidity (50±5)% for a minimum of 24 h.

Test Conditioning: Receiving room: Volume is 145 m³;
Test floor: Reinforced concrete slab of thickness 140mm;
Category of thet specimen: Category I (small specimens);
PVC Floor specifications: 5.2 mm thickness;
Temperature: Relative humidity: 68%.

Test Principle: Measurement according to ASTM E492-09（Standard Test Method for Laboratory Measurement of Impact Sound Transmission Through Floor-Ceiling Assemblies Using the Tapping Machine）and ASTM E989-06（Standard Classification for Determination of Impact Insulation Class （IIC）[1]）and ASTM E2179-03.

The normalized impact sound pressure level $L_n$ is calculated by the following equation:

$$L_n = \bar{L}_0 - 10\lg\frac{A_0}{A_1}$$

Where

$\bar{L}_0$ is impact sound pressure level, dB;

$A$ is the measured equivalent absorption area of the receiving room, $m^2$;

$A_0$ is the reference equivalent absorption area, $A_0$ =10 $m^2$ ;

$L_n$ is the normalized impact sound pressure level of the heavyweight standard floor without floor covering, dB;

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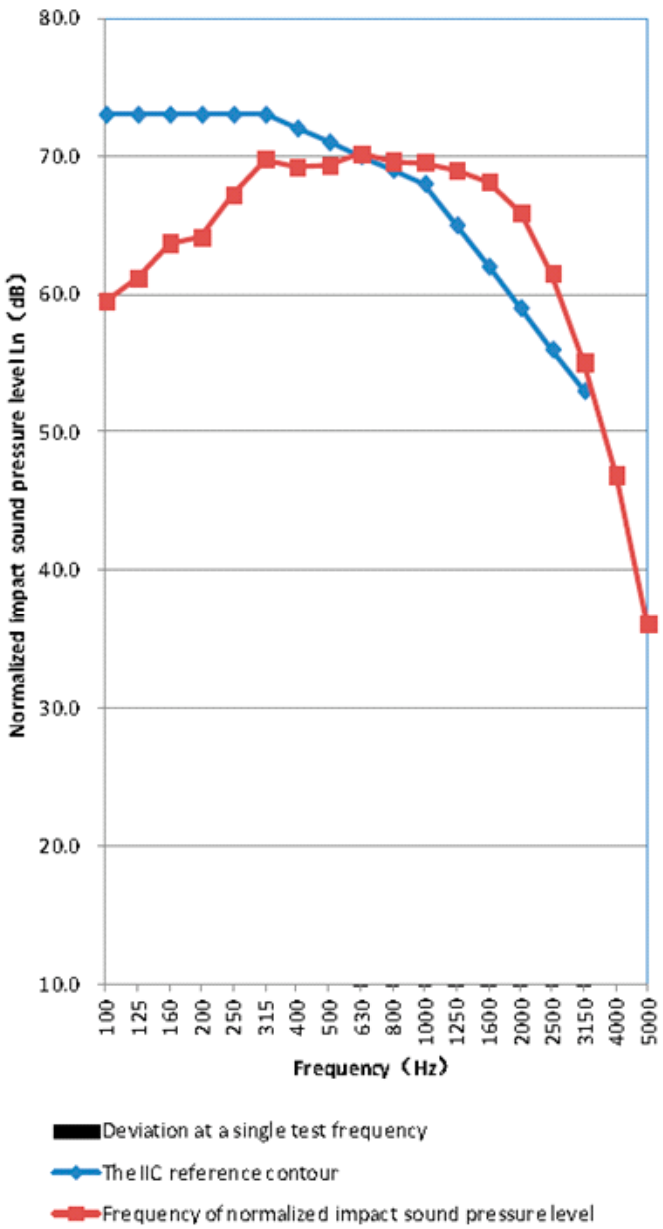
Tests Conducted

**Result:**

Frequency spectrum of normalized impact sound pressure level

| Frequency f(Hz) | $L_n$ (dB) |
|---|---|
| 100 | 59.5 |
| **125** | **61.1** |
| 160 | 63.7 |
| 200 | 64.1 |
| **250** | **67.2** |
| 315 | 69.8 |
| 400 | 69.2 |
| **500** | **69.3** |
| 630 | 70.1 |
| 800 | 69.6 |
| **1000** | **69.5** |
| 1250 | 68.9 |
| 1600 | 68.1 |
| **2000** | **65.8** |
| 2500 | 61.5 |
| 3150 | 55.0 |
| **4000** | **46.9** |
| 5000 | 36.1 |
| IIC | **39** |

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Tests Conducted

| Calculating table of the weighted reduction of impact sound pressure level | | | | | | | |
|---|---|---|---|---|---|---|---|
| *f*(*Hz*) | *Ln*,0(*dB*) | *Ln*,1(*dB*) | Δ*L*(*dB*) | *Ln*,r,0(*dB*) | *Ln*,r(*dB*) | **Reference value 70dB** | **Unfavorable deviation dB** |
| 100 | 61.3 | 59.5 | 1.8 | 67 | 65.2 | 72.0 | <0 |
| 125 | 61.7 | 61.1 | 0.6 | 67.5 | 66.9 | 72.0 | <0 |
| 160 | 68.1 | 63.7 | 4.5 | 68 | 63.5 | 72.0 | <0 |
| 200 | 69.4 | 64.1 | 5.3 | 68.5 | 63.2 | 72.0 | <0 |
| 250 | 68.5 | 67.2 | 1.3 | 69 | 67.7 | 72.0 | <0 |
| 315 | 70.3 | 69.8 | 0.6 | 69.5 | 68.9 | 72.0 | <0 |
| 400 | 70.4 | 69.2 | 1.2 | 70 | 68.8 | 71.0 | <0 |
| 500 | 72.8 | 69.3 | 3.5 | 70.5 | 67.0 | **70.0** | <0 |
| 630 | 73.5 | 70.1 | 3.4 | 71 | 67.6 | 69.0 | <0 |
| 800 | 73.2 | 69.6 | 3.6 | 71.5 | 67.9 | 68.0 | <0 |
| 1000 | 72.7 | 69.5 | 3.2 | 72 | 68.8 | 67.0 | 1.8 |
| 1250 | 73.2 | 68.9 | 4.2 | 72 | 67.8 | 64.0 | 3.8 |
| 1600 | 73.6 | 68.1 | 5.5 | 72 | 66.5 | 61.0 | 5.5 |
| 2000 | 72.6 | 65.8 | 6.8 | 72 | 65.2 | 58.0 | 7.2 |
| 2500 | 71.3 | 61.5 | 9.8 | 72 | 62.2 | 55.0 | 7.2 |
| 3150 | 70.6 | 55.0 | 15.5 | 72 | 56.5 | 52.0 | 4.5 |
| Sum( Unfavorable deviation) =29.9<32.0 dB<br>*IICc* =40dB | | | | | | | |
| Test Result: △***IIC*= *IICc*-28=12dB** | | | | | | | |

7 Heavy Elements Analysis (except modelling clay)

As per Section 4.3.5 and Section 8.3.2 to 8.3.5 of the ASTM Standard Consumer Safety Specification on Toy Safety F963-17, heavy elements migration content were determined by Inductively Coupled Argon Plasma Spectrometry.

| Element | Result (ppm)<br>Tested component<br>(1) to (4) | Reporting limit (ppm) | Limit (ppm) |
|---|---|---|---|
| Sol. Barium (Ba) | ND | 5 | 1000 |
| Sol. Lead (Pb) | ND | 5 | 90 |
| Sol. Cadmium (Cd) | ND | 5 | 75 |
| Sol. Antimony (Sb) | ND | 5 | 60 |
| Sol. Selenium (Se) | ND | 5 | 500 |
| Sol. Chromium (Cr) | ND | 5 | 60 |
| Sol. Mercury (Hg) | ND | 5 | 60 |
| Sol. Arsenic (As) | ND | 2.5 | 25 |

Sol. = Soluble
ppm = part per million = mg/kg
ND = Not detected

Tested Components: See component list in the last section of this report

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8 Phthalate Content

As per CPSC-CH-C1001-09.3, by Gas Chromatographic-Mass Spectrometric (GC-MS) analysis.

For 6 phthalate

| Test item | CAS No. | Result (%) Tested component (1+2), (3+4) | Reporting Limit (%) | Limit (%) |
|---|---|---|---|---|
| Dibutyl phthalate (DBP) | 84-74-2 | ND | 0.01 | 0.1 |
| Di-(2-ethyl hexyl) phthalate (DEHP) | 117-81-7 | ND | 0.01 | 0.1 |
| Benzyl butyl phthalate (BBP) | 85-68-7 | ND | 0.01 | 0.1 |
| Di-iso-nonyl phthalate (DINP) | 28553-12-0/ 68515-48-0 | ND | 0.01 | 0.1 |
| Di-n-octyl phthalate (DNOP) | 117-84-0 | ND | 0.01 | 0.1 |
| Di-iso-decyl phthalate (DIDP) | 26761-40-0/ 68515-49-1 | ND | 0.01 | 0.1 |

The above limit was quoted according to US Consumer Product Safety Improvement Act 2008 for prohibition on sale of certain products containing specified phthalates.

ND = Not detected (less than reporting limit)

Tested Components: See component list in the last section of this report

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Component list:

(1) Black plastic film (surface).
(2) Grey/dark grey plastic (surface).
(3) Grey foam (interlayer).
(4) Light grey foam (interlayer).

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End of report





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