# Anhui Sentai WPC TEC Flooring Co., Ltd.

# TEST REPORT

**SCOPE OF WORK**
SPC IRE Flooring/rigid vinyl plank

**REPORT NUMBER**
200629009SHF-001

**TEST DATE(S)**
2020-06-29 - 2020-07-20

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19

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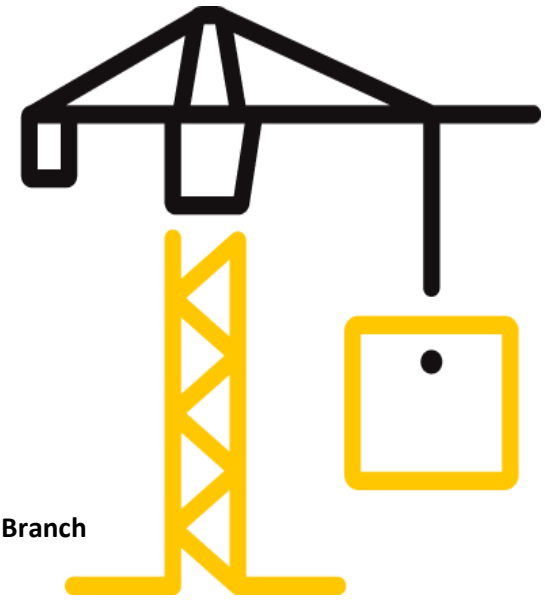

**Intertek Testing Services Shenzhen Ltd. Shanghai Fengxian Branch**

# Test Report

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# Test Report

Issue Date: 2020-07-20 Intertek Report No. 200629009SHF-001

Applicant: Anhui Sentai WPC TEC Flooring Co., Ltd.

Address: No.19, Guohua Rd., Guangde TED Zone, Guangde, Anhui, China

Attn: Jerry

Test Type： Performance test, samples provided by the applicant.

**Product Information**

| | | | |
|---|---|---|---|
| **Product Name** | SPC IRE Flooring/rigid vinyl plank | **Brand** | / |
| **Sample Description** | Good condition | **Sample Amount** | 40 pcs |
| | | **Received Date** | 2020-06-29 |

| **Sample ID** | **Model** | **Specification** |
|---|---|---|
| S200629009SHF.001~012 | SPC0533, 3.8/0.5mm | 1220*228*3.8mm |

**Test Methods And Standards**

| | |
|---|---|
| **Test Standard** | ISO 24337:2019, EN 13329:2006+A1:2008 Annex E, EN 15468:2016 Annex A, EN 13329:2006+A1:2008 Annex F, EN 16094:2012 Procedure A, EN 425:2002, EN 424:2001, EN ISO 24343-1:2012, EN 438-2:2016+A1:2018 Section 26, ISO 24336:2005, ISO 24334:2014, EN ISO 23999:2018 |
| **Specification Standard** | EN 16511:2014+A1:2019 |
| **Test Conclusion** | The samples were tested according to the above standards, and the results are shown in the following page. |

Note:

1.This report relates specifically to the sample(s) that were drawn and provided by the applicant or their nominated third party. The reported result(s) provide no warranty or verification on the sample(s) representing any specific goods and/or shipment and only relate to the sample(s) as received and tested.

**Report Authorized**

Flora Fan Jackie Zhou

Name: Flora Fan Name: Jackie Zhou

Title: Reviewer Title: Project Engineer

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# Test Report

Issue Date: 2020-07-20 Intertek Report No. 200629009SHF-001

**Test Items, Method and Results:**

EN 16511:2014+A1:2019 Loose-laid panels - Semirigid multilayer modular floor covering (MMF) panels with wear resistant top layer

**General requirements:**

| Characteristics | Test results | Verdict |
|---|---|---|
| Geometrical Characteristics | refer to next page(s) | Pass |

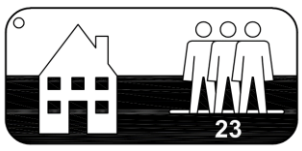
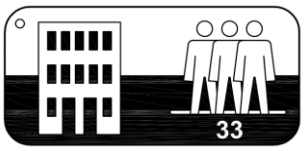
**Classification requirements:**

| Characteristics | Test results | Classification |
|---|---|---|
| Wear resistance (method A) | > 2000 cycles | Class 33 |
| Wear resistance (method B) | > 5000 cycles | Class 33 |
| Impact resistance (big ball) | 1600 mm | Class 33 |
| Micro-scratch resistance | MSR-A2 | Class 33 |
| Castor chair resistance | Pass 25000 cycles | Class 33 |
| Effect of furniture leg | No visible damage | Class 33 |
| Residual indentation | 0.01 mm | Class 33 |
| Resistance to staining | refer to next page(s) | Class 33 |
| Swelling | refer to next page(s) | Class 33 |
| Locking strength | refer to next page(s) | Class 33 |
| Dimensional stability due to variation of temperature | refer to next page(s) | Class 33 |

Note:

1. Detailed test results see page 7-18
2. The classification scheme and use intensity symbols are described in EN ISO 10874:2012.

**Level of use class:**

| Class | Symbol | Intensity of use |
|---|---|---|
| 23 |   | Domestic Heavy |
| 33 |   | Commercial Heavy |

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# Test Report

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**Test Items, Method and Results:**

**EN 16511 Classification**

| **Class** (EN ISO 10874) → **Characteristic**↓ | **21/22** | **23** | **31** | **32** | **33** | **34** | **Reference test method** |
|---|---|---|---|---|---|---|---|
| Wear resistance IP, method A or | ≥ 200 cycles | ≥ 400 cycles | ≥ 600 cycles | ≥ 1200 cycles | ≥ 2000 cycles | ≥ 4000 cycles | EN 13329:2006+ A1:2008, Annex E |
| Wear resistance IP, method B | ≥ 500 cycles | ≥ 1000 cycles | ≥ 1500 cycles | ≥ 3000 cycles | ≥ 5000 cycles | ≥ 7000 cycles | EN 15468:2016, Annex A |
| Impact resistance [mm] (big ball) | ≥ 400 mm | ≥ 600 mm | ≥ 800 mm | ≥ 1200 mm | ≥ 1600 mm | ≥ 1800 mm | EN 13329:2006 + A1:2008, Annex F[f] |
| Micro-scratch resistance [class] | | | | ≤ MSR-A3[e] | ≤ MSR-A2[e] | ≤ MSR-A2[e] | EN 16094 |
| Castor chair resistance [a, c] | | | 10000 cycles | 25000 cycles | 25000 cycles | 25000 cycles | EN 425:2002 |
| Effect of furniture leg | | | | No visible damage | No visible damage | No visible damage | EN 424 (tested with foot type 0) |
| Residual indentation | ≤0.3mm | ≤0.3mm | ≤0.3mm | ≤ 0.2mm | ≤ 0.2mm | ≤ 0.15mm | EN ISO 24343-1 |
| Resistance to staining [grade, per group] | Water, coffee, cleaning solution (10 min): grade 4 | Water, coffee, cleaning solution (10 min): grade 4 | Groups 1 and 2: grade 4 Group 3: grade 3 | Groups 1 and 2: grade 5 Group 3: grade 4 | Groups 1 and 2: grade 5 Group 3: grade 4 | Groups 1 and 2: grade 5 Group 3: grade 4 | EN 438-2: Group 1 only 10 min |
| Swelling * [%] | ≤ 20 | ≤ 20 | ≤ 20 | ≤ 18 | ≤ 18 | ≤ 12 | ISO 24336 |
| Locking strength[b]** [kN/m]<br>Locking strength[b]* | | | | Long side ≥ 1.0<br>Short side ≥ 1.5<br>Long side ≥ 1.0<br>Short side ≥ 2.0 | | Long side ≥ 2.0<br>Short side ≥ 3.5<br>Long side ≥ 1.0<br>Short side ≥ 3.5 | ISO 24334 |
| Dimensional variations due to variation of climate * | | | | | | $\Delta W_{avg}$ , $\Delta l_{avg}$: ≤0.15%<br>-0.20% ≤ $C_{avg}$ ≤0.25%[d]<br>$J_{L, avg}$, $J_{S, avg}$ ≤0.15mm<br>$h_{L,avg}$, $h_{S,avg}$ ≤0.15 mm | ISO 24339 |
| Dimensional stability due to variation of temperature ** | ≤ 0.5% | ≤ 0.5% | ≤ 0.25% | ≤ 0.25% | ≤ 0.25% | ≤ 0.25% | EN ISO 23999 |

a. No disturbance to the surface only gloss changes, no delamination, cracks or disruptions.

b. Only for loose-laid panels.

c. Tested with soft wheels on loose laid panels without underlayment.

d. Take the maximum of Cavg from wet climate (23 °C, 85 % relative humidity) and the minimum of Cavg from dry climate (23 °C, 30 % relative humidity) for the evaluation.

e. Due to detected inhomogeneity of the Scotch Brite fleece SB 7440 (medium fine), the test results of EN 16094,procedure B shall not be used for classification.

f. Only the assessment of cracks on the surface shall be carried out. The deformation is not to be taken into consideration.

* Only for panels with substrates or layers with hygroscopic properties, e.g. HDF or cork.

** Only for products with significant reaction on temperature changing, e.g. thermoplastic vinyl core.

# Test Report

Issue Date: 2020-07-20 Intertek Report No. 200629009SHF-001

**Test Items, Method and Results:**

Test Item: Geometrical characteristics
Test Method: ISO 24337:2019
Conditioning: Condition the test specimens at (23±2)°C and (50±5)% relative humidity to constant mass

| Test Item | Test Result | Nominal value | Test Requirement in EN 16511 |
|---|---|---|---|
| Thickness | Average value= 3.85 mm<br>$^{\triangle}t_{avg}$ = 0.05 mm<br>$t_{max}$-$t_{min}$ = 0.03 mm | 3.8 mm | $^{\triangle}t_{avg} \leq 0.50$ mm<br>$t_{max}$-$t_{min} \leq 0.50$mm |
| Length | Average value= 1219.97 mm<br>Maximum $^{\triangle}l$ = 0.06 mm<br>N/A mm/m | 1220 mm | $l \leq 1500$mm: $^{\triangle}l \leq 0.5$ mm<br>$l > 1500$mm: $^{\triangle}l \leq 0.3$ mm/m |
| Width | Average value= 227.99 mm<br>$^{\triangle}W_{avg}$ = 0.01 mm<br>$W_{max}$-$W_{min}$ = 0.04 mm | 228 mm | $^{\triangle}W_{avg} \leq 0.10$ mm<br>$W_{max}$-$W_{min} \leq 0.20$ mm |
| Squareness | $q_{max}$ = 0.06 mm | - | $q_{max} \leq 0.20$ mm |
| Straightness | $S_{max}$ = 0.06 mm/m | - | $S_{max} \leq 0.30$ mm/m |
| Flatness | Maximum single values:<br>$f_{w, concave}$= 0.02 %<br>$f_{w, convex}$ = N/A %<br>Maximum single values:<br>$f_{l, concave}$ = 0.01 %<br>$f_{l, convex}$ = N/A % | - | Maximum single values:<br>$f_{w, concave} \leq 0.15$ %,<br>$f_{w, convex} \leq 0.20$ %<br>$f_{l, concave} \leq 0.50$ %,<br>$f_{l, convex} \leq 1.00$ % |
| Openings | $O_{avg}$ = 0.05 mm<br>$O_{max}$ = 0.06 mm | - | $O_{avg} \leq 0.15$ mm<br>$O_{max} \leq 0.20$ mm |
| Height difference | $h_{avg}$ = 0.05 mm<br>$h_{max}$ = 0.06 mm | - | $h_{avg} \leq 0.10$ mm<br>$h_{max} \leq 0.15$ mm |

# Test Report

Issue Date: 2020-07-20 Intertek Report No. 200629009SHF-001

**Test Items, Method and Results:**

Test Item: Abrasion/Wear resistance

Test Method: EN 13329:2006+A1:2008, Annex E

Conditioning: Condition the test specimens at (23±2)°C and (50±5)% relative humidity for at least 24h

Test Condition:

Rotation frequency: 60 r/min

Abrasive material: Taber S-42 abrasive paper strips

Load on each wheel: 500 g

Examine the test specimen for abrasion after each 100 r.

Renew the abrasive papers after every 200 r.

Test Result:

| Parameter | Specimen 1 | Specimen 2 | Specimen 3 |
|---|---|---|---|
| Initial wear point (IP) value, r | > 2000 | > 2000 | > 2000 |
| Average IP value, r | > 2000 | | |

Note:

1. The initial wear point (IP) is reached when there are areas of at least 0.60 $mm^2$ wear through in two quadrants and an area of 0.60 $mm^2$ wear through becomes visible in a third quadrant.

2. Abbreviation "r" = revolutions/cycles

# Test Report

Issue Date: 2020-07-20 Intertek Report No. 200629009SHF-001

**Test Items, Method and Results:**

Test Item: Abrasion resistance

Test Method: EN 15468:2016, Annex A

Conditioning: Condition the test specimens at (23±2)°C and (50±5)% relative humidity for at least 24h

Test Condition:

Rotation frequency: 60 r/min

Abrasive material: Taber S-39 abrasive wheels; S-41 #240 Aluminum Oxide grit

Load on each wheel: 1000 g

Rate of grit flow: 21±3 g/min

Calibration factor: 0.96

Inspect the test piece after every 200 r. When the test nears its end, inspect after every 100 r.

Test Result:

| Parameter | Specimen 1 | Specimen 2 | Specimen 3 |
|---|---|---|---|
| Initial wear point (IP) value, r | > 5000 | > 5000 | > 5000 |
| Average IP value, r | > 5000 | | |

Note:

1. The initial wear point (IP) is reached when the test specimen shows wear through in 12 sectors of 16 and wear through at least in 1 sector per quadrant.
2. Abbreviation "r" = revolutions/cycles
3. Test result is corrected with the calibration factor.

# Test Report

Issue Date: 2020-07-20 Intertek Report No. 200629009SHF-001

**Test Items, Method and Results:**

Test Item: Resistance to impact by large diameter ball

Test Method: EN 13329:2006+A1:2008, Annex F

Conditioning: Condition the test specimens at (23±2)°C and (50±5)% relative humidity for at least 72h

Test Condition:

| | | |
|---|---|---|
| Impactor: | Polished steel ball | |
| Impactor mass: | 324 | g |
| Impactor diameter: | 42.8 | mm |
| Drop height: | 1600 | mm |

Test Result:

| Specimen | Crack on the surface (Yes/No) | Verdict |
|---|---|---|
| 1 | No | Pass |
| 2 | No | |
| 3 | No | |
| 4 | No | |
| 5 | No | |

# Test Report

Issue Date: 2020-07-20 Intertek Report No. 200629009SHF-001

**Test Items, Method and Results:**

Test Item: Micro-scratch resistance

Test Method: EN 16094:2012, Procedure A

Conditioning: Condition the test specimens at (23 ± 2)°C and (50 ± 5)% relative humidity for at least 1 week

Test Condition:

| | |
|---|---|
| Scrub material: | SB 7447 (very fine) |
| Holder for scrub material: | Version 2, 6N |
| Speed factor: | 1 |
| Number of rubs: | 80 |
| Glossmeter geometry: | 85 ° |

Test Result:

| Specimen | Gloss change (%) |
|---|---|
| 1 | -22.5 |
| 2 | -24.5 |
| 3 | -20.6 |
| Average value | -23 |
| Classification | MSR-A2 |

Classification of mean values of gloss change as per EN 16094 procedure A

| Micro-Scratch resistance class according to procedure A | \|Change of gloss\| |
|---|---|
| MSR-A1 | ≤ 10% |
| MSR-A2 | > 10% to ≤ 30% |
| MSR-A3 | > 30% to ≤ 50% |
| MSR-A4 | > 50% to ≤ 70% |
| MSR-A5 | > 70% |

# Test Report

Issue Date: 2020-07-20 Intertek Report No. 200629009SHF-001

**Test Items, Method and Results:**

Test Item: Castor chair test

Test Method: EN 425:2002

Conditioning: Condition the test specimens at (23 ± 2)°C and (50 ± 5)% relative humidity for at least 24h

Test Condition: At a temperature range of 18°C to 25 °C

| | | |
|---|---|---|
| Load mass: | 90 | kg |
| Test castors: | Type | W |
| Speed of rotating platform: | 20 | r/min |
| Speed of castor assembly: | 50 | r/min |
| Total test revolutions: | 25000 | r |
| Mounting of the specimen: | Floating installation with click joints | |

Test Result:

| Type of damage | Observation (Yes/No) | Verdict |
|---|---|---|
| Delamination | No | Pass |
| Opening of joints | No | |
| Surface damage | No | |
| Crazing | No | |

Test Photo:

After test

# Test Report

Issue Date: 2020-07-20 Intertek Report No. 200629009SHF-001

**Test Items, Method and Results:**

Test Item: Effect of simulated movement of a furniture leg

Test Method: EN 424:2001

Conditioning: Condition the test specimens at (23 ± 2)°C and (50 ± 5)% relative humidity for at least 5 days

Test Condition:

| | | |
|---|---|---|
| Type of Feet: | Type | 0 |
| Applied Mass: | 32 | kg |
| Test Speed: | 0.18 | m/s |

Test Result:

| Path | Observation | | Verdict |
|---|---|---|---|
| | Length direction/Longitudinal direction | Width direction/Transverse direction | |
| 1 | No visible damage | No visible damage | Pass |
| 2 | No visible damage | No visible damage | |
| 3 | No visible damage | No visible damage | |

Record the damage caused for each test path if any damage is observed

a) deterioration in the flatness of the surface;

b) damage which partially destroys the surface;

c) cuts of varying depths;

d) penetrating edges;

e) in the case of an open joint floor covering, a joint opening greater or equal to 1 mm;

f) in the case of a treated or welded joint, its failure.

# Test Report

Issue Date: 2020-07-20 Intertek Report No. 200629009SHF-001

**Test Items, Method and Results:**

Test Item: Residual indentation

Test Method: EN ISO 24343-1:2012

Conditioning: Condition the test specimens at (23 ± 2)°C and (50 ± 5)% relative humidity for at least 24h

Test Condition:

| | | |
|---|---|---|
| Indenter: | Steel cylindrical indenter, with the edge of the flat base slightly rounded | |
| Indenter diameter: | 11.3 | mm |
| Total load applied: | 500 | N |
| Indentation time: | 150 | min |
| Recovery time: | 150 | min |

Test Result:

| Residual Indentation | Result (mm) |
|---|---|
| Specimen 1 | 0.01 |
| Specimen 2 | 0.01 |
| Specimen 3 | 0.01 |
| Average value | 0.01 |

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# Test Report

Issue Date: 2020-07-20 Intertek Report No. 200629009SHF-001

**Test Items, Method and Results:**

Test Item: Resistance to staining
Test Method: EN 438-2:2016+A1:2018, Section 26
Conditioning: Condition the test specimens at (23 ± 2)°C and (50 ± 5)% relative humidity for at least 24h

Test Result:

| Group | Staining agent | Duration of contact | Result of visual changes |
|---|---|---|---|
| 1 | Water | 10 min | 5 |
| 1 | Acetone | 10 min | 5 |
| 1 | Cleaning solution | 10 min | 5 |
| 2 | Coffee (approx. 80°C) | 16 h | 5 |
| 3 | Sodium hydroxide (25% solution) | 10 min | 5 |
| 3 | Hydrogen peroxide (30% solution) | 10 min | 5 |
| 3 | Carbon black suspension in paraffin oil | 10 min | 5 |

Assessment of results

| Numerical rating | Description |
|---|---|
| 5 | No change<br>test area indistinguishable from adjacent surrounding area |
| 4 | Minor change<br>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<br>test area distinguishable from adjacent surrounding area, visible in several viewing directions, e. g. discoloration, change in gloss and colour |
| 2 | Significant change<br>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<br>the structure of the surface being distinctly changed and/or discoloration, change in gloss and colour, and / or the surface material being totally or partially delaminated |

# Test Report

Issue Date: 2020-07-20 Intertek Report No. 200629009SHF-001

**Test Items, Method and Results:**

Test Item: Determination of thickness swelling after partial immersion in water

Test Method: ISO 24336:2005

Conditioning: Condition the test specimens at (23±2)°C and (50±5)% relative humidity to constant mass

Test Condition: Specimens are partially immersed(50 mm) in water at 20℃, during 24h

Test Result:

| Specimen | Direction | Thickness swelling (%) | | | |
|---|---|---|---|---|---|
| | | Point 1 | Point 2 | Point 3 | Average |
| 1 | taken in length direction | 0.00 | 0.26 | 0.00 | 0.15 |
| 2 | | 0.00 | 0.26 | 0.00 | |
| 3 | taken in width direction | 0.00 | 0.26 | 0.52 | |
| 4 | | 0.26 | 0.00 | 0.26 | |

# Test Report

Issue Date: 2020-07-20 Intertek Report No. 200629009SHF-001

**Test Items, Method and Results:**

Test Item: Locking Strength
Test Method: ISO 24334:2014
Conditioning: Condition the test specimens at (23±2)°C and (50±5)% relative humidity to constant mass
Test Condition: Test speed 0.5 mm/min

Test Result:

Long side joint

| Parameter | Average Result |
|---|---|
| Maximum locking strength $F_{max}$ (N) | 930 |
| Specific locking strength (kN/m) | 4.4 |
| Locking strength at 0.2 mm joint opening $F_{0.2}$ (N) | 925 |
| Specific locking strength at 0.2 mm joint opening (kN/m) | 4.4 |

Short side joint

| Parameter | Average Result |
|---|---|
| Maximum locking strength $F_{max}$ (N) | 852 |
| Specific locking strength (kN/m) | 4.1 |
| Locking strength at 0.2 mm joint opening $F_{0.2}$ (N) | 852 |
| Specific locking strength at 0.2 mm joint opening (kN/m) | 4.1 |

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# Test Report

Issue Date: 2020-07-20 Intertek Report No. 200629009SHF-001

**Test Items, Method and Results:**

Test Item: Dimensional stability and curling

Test Method: EN ISO 23999:2018

Conditioning:

| | | |
|---|---|---|
| Temperature: | 23 | °C |
| Humidity: | 50 | % |
| Duration: | 24 | h |

Measure the initial length and curling

Test Condition:

| | | |
|---|---|---|
| Temperature: | 80 | °C |
| Duration: | 6 | h |

Reconditioning:

| | | |
|---|---|---|
| Temperature: | 23 | °C |
| Humidity: | 50 | % |
| Duration: | 24 | h |

Measure the final length and curling

Test Result:

| Specimen | Dimensional stability (%) | | Curling (mm) |
|---|---|---|---|
| | Length direction/Machine direction | Width direction/Across machine direction | |
| 1 | 0.09 | 0.02 | 0.03 |
| 2 | 0.08 | 0.00 | 0.03 |
| 3 | 0.09 | 0.00 | 0.02 |
| Average | 0.10 | 0.00 | 0.0 |
| Max. | 0.09 | 0.02 | 0.03 |

Note:

1. Dimensional stability = (initial length - final length)×100/initial length

Express the average value to the nearest 0.05%

A negative value indicates expansion, and a positive value indicates shrinkage .

2. Curling = final curling - initial curling

Express the average value to the nearest 0.5mm

# Test Report

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**Appendix A: Sample Received Photo**

Front View(Test surface)

Back View

**Revision:**

| NO. | Date | Changes | Author | Reviewer |
|---|---|---|---|---|
| 200629009SHF-001 | 2020-07-20 | First issue | Jackie Zhou | Flora Fan |