NewTechWood®

Company History & Overview

NewTechWood Composite Manufacturing
UltraShield Professional Decking

- 1989, T&T Group established in USA, specialised in plastic recycling, reprocessing and compounding.
- 1998, developed the first international closed loop plastic recycling program for household electronic products.
- 2000, began R&D of washing and drying consumer bottles.

Developed a technology to separate different types of plastic materials and also formulated and compounded for underground pipeline market.

It became a supplier of recycling plastic material for NewTechWood from year 2006.

NewTechWood®

- 2004, NewTechWood Composite Manufacturing founded, specialised in WPC (Wood Plastic Composite products)
- 2006, started production of first generation product and exported to North American and Asian Pacific markets.
- 2010, began R&D of the 2nd generation WPC, the co-extruded composite product (**UltraShield**).

UltraShield®

- 2011, NewTechWood launched **UltraShield** in Canton Fair, focusing on the decking products.

- 2012, continued to develop profiles for many different types of outdoor products such as deck tile, fencing & wall cladding.

UltraShield® Naturale™

- 2013, NewTechWood launched **UltraShield** Naturale in Batimat, Paris. It is a new technology focusing on enhancing the aesthetics and feel of the product to make it more internationally acceptable.

- 2014, developed 3 more colours to bring the total colour range to 12 and created better decking systems and DIY products.

UltraShield®
Deck Tile

- 2012, began R&D of DIY composite decking, and created UltraShield Deck Tile(UltraShield QuickDeck).

Patent Pending
DECK-A-FLOOR®

- 2013, NewTechWood launched a new patented **DECK-A-FLOOR** system to exclusive distributors.

- 2014, **DECK-A-FLOOR** became available to order online and in store at Home Depot & Build Direct.

- 2014, NewTechWood continues to develop an entire outdoor system to complement **DECK-A-FLOOR** which includes trims and fascia, planter/sand box, LED solar lights, and grass pads.

Patent Pending
DECK-A-FLOOR® PRO
OUTDOOR FLOORING

- 2014, launched **DECK-A-FLOOR PRO**, an outdoor decking system used on traditional joists with patent pending **PRO** Clips

NewTechWood Infrastructure

- NewTechWood has 70,000 sqm of manufacturing and warehousing space
- Operating 40 extrusion lines and having an annual capacity over 25,000 mt.

• Lab centre

Research and Development for NewTechWood is the key to its success, as many new products are continuously developed to meet customer needs and demands.

Yearly funding is dedicated to our R&D department so that we can continually advance our technology to improve and create.

• Mixing facility

Using a Loss-and-Weight feeding system, NewTechWood is able to ensure that its blend of raw materials is mixed uniformly and consistent all the time.

NewTechWood®

Why UltraShield®?

NewTechWood

UltraShield®

Why insist to cap completely around ?

To make the board capped 360 degree around :

1. It will give the board maximum protection and **STOP** all the first generation product problems and also the non-360 capped board problems such as :
   a) Cupping , b) Cracking and c) Swelling

2. It requires more sophistication in technology, advanced skills and knowledge in mold design BUT NewTechWood insists to make all **UltraShield®** boards with 360 degree fully capped composite products, including the tiny area of the groove.

NewTechWood

Because this is the only way to give ULTRA protection

1. Five types of PE Composite Wood

in the Current Market

Based on PE composite wood market, they can be divided into capped and non capped composite wood. Five different types of composite wood can be identified as follows.

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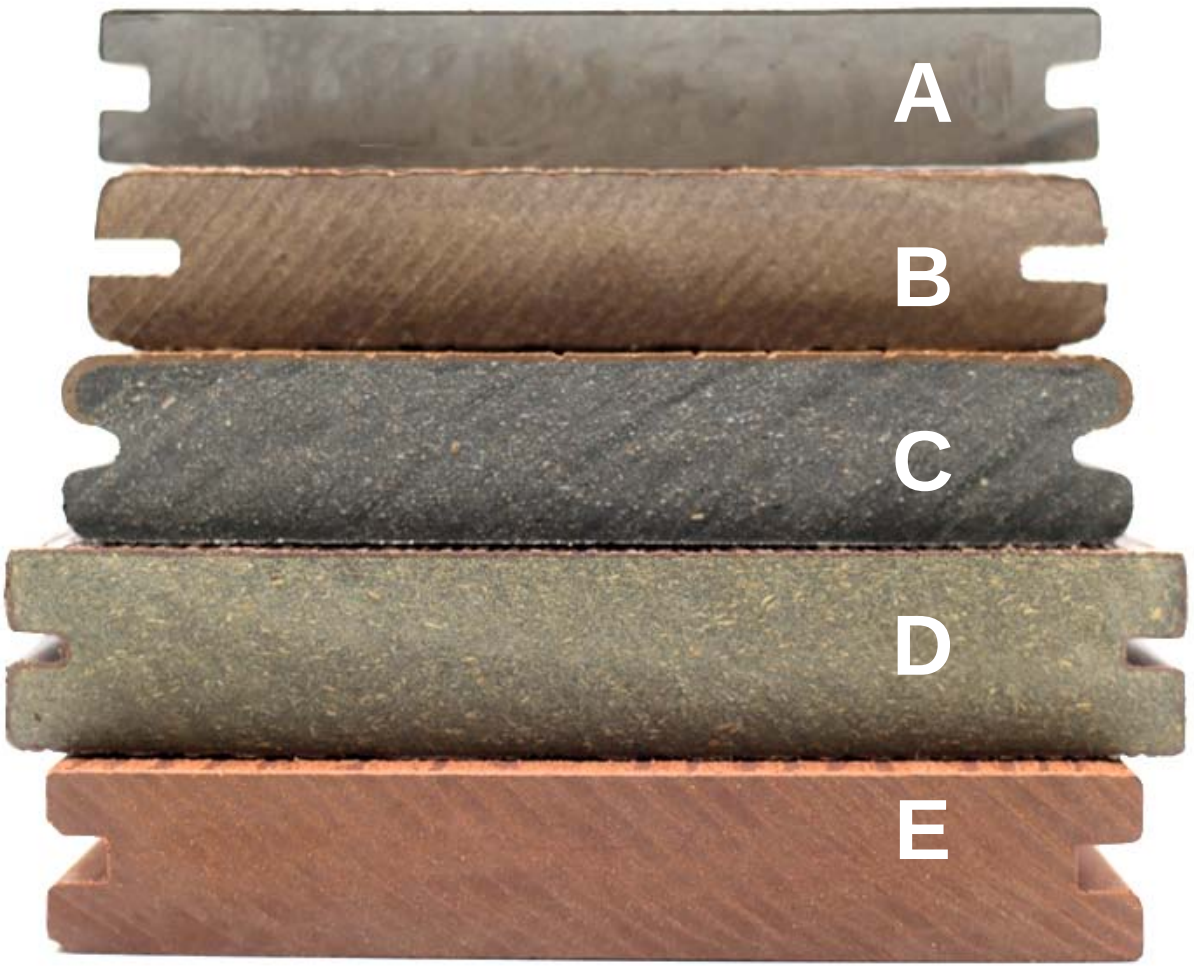

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A

360 degree completely capped

B

Groove was cut out, not completely capped

C

Half capped composite wood

D

Capped layer contains wood powder

E

Non capped, known as first generation

Picture shown:

Type A: 360 degree completely capped, including groove

2. Potential problems for non capped composite wood product

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No Skin?

E

Non capped, known as first generation

First generation (non capped) composite wood,
No capped layer to protect the core.

D

Capped layer contains wood powder

Some capped composite wood product that contains wood powder in the cap layer, which means the wood powder is still exposed to the harsh environment, same as the first generation

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Potential Problems

1. Crumbling
2. Color Fading
3. Fungus & Mold & Mildew
4. Cracking
5. Scratching
6. Staining

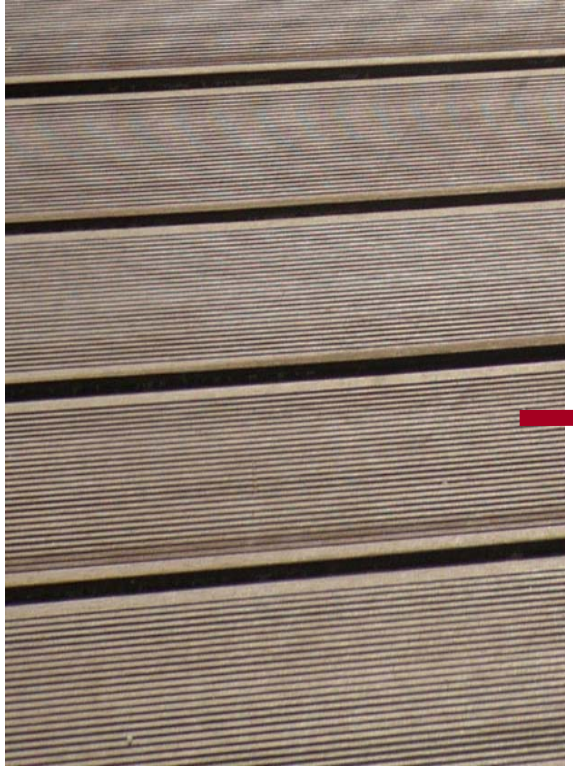
Without a capped layer to protect the core, the wood fiber is exposed to the surface and damaged by various harsh weather condition, UV, moisture, bacteria, fungus and mold.

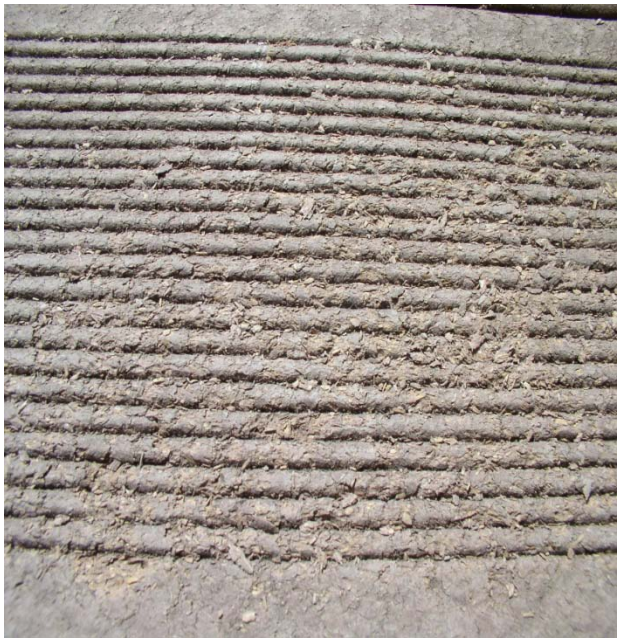
Not only the color will be faded out, the structure and composition will be degraded or even destroyed. Many severe problems have already risen during the past few years in the wood composite market.

1. Crumbling

- When the first generation composite board expose to the UV and water, it begins to decomposite and break down. This is due to an improper amount of bounding agent and antioxidant added to the first generation composite material.

  The wood fiber absorbs moisture with UV together which causes composite decking to decay, crumble, decompose, degenerate, deteriorate, disintegrate, and rot.





2. Color Fading

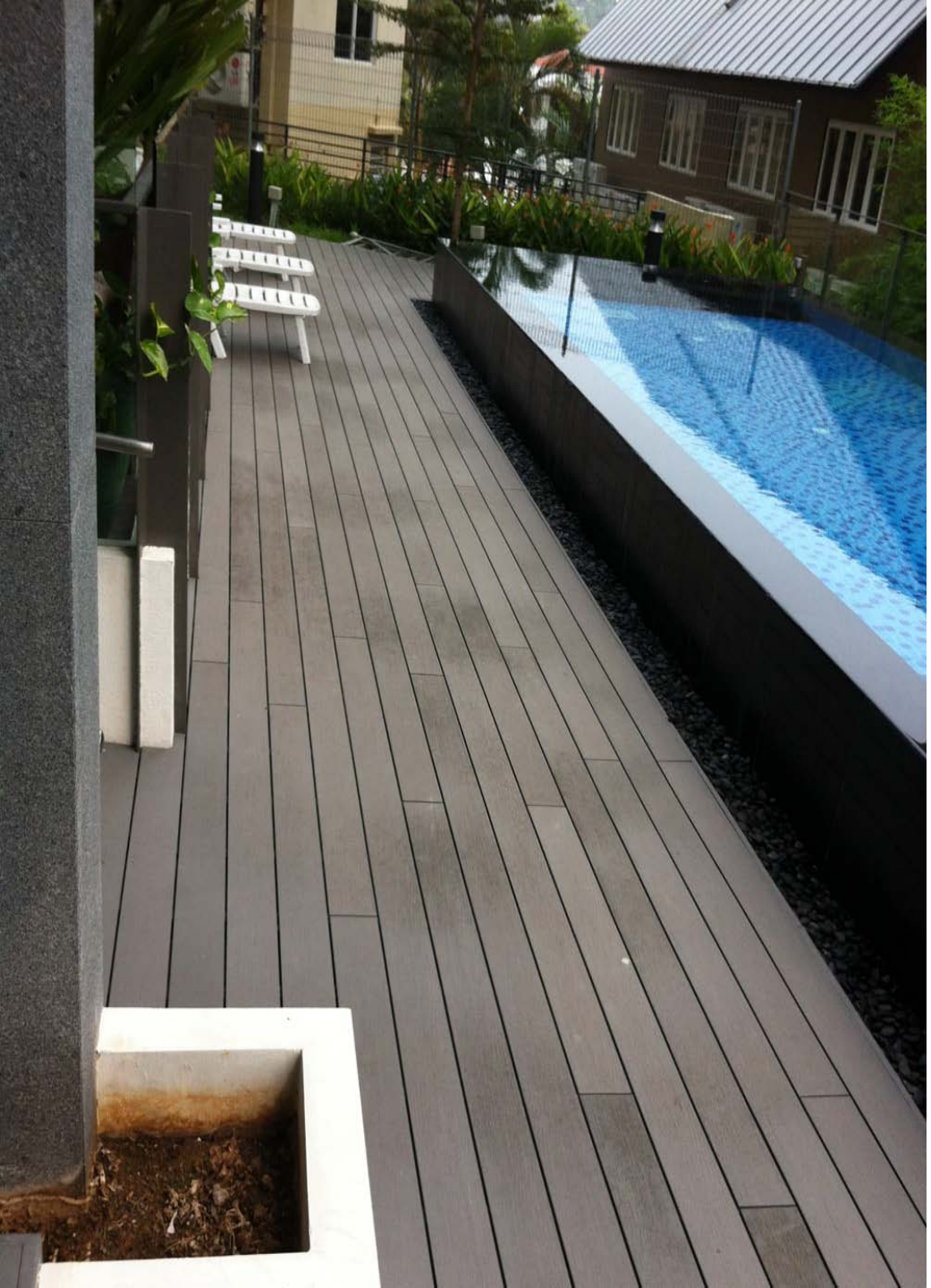
- Color fading has been a huge issue. The reason for the fading comes from the wood fiber content. Even when mixed with enough antioxidants and UV stabilizers it will still fade due to the nature of the wood fiber. What's even worst it is the fading level would hardly be the same.

Color difference-many decks were faded with uneven color resulting in some boards being lighter and others getting darker.

3. Fungus, Mold , Mildew

- This problem really has found in many places in U.S. because of extreme climate condition. Some of the places go through hot, cold and wet all in one day. Mold is actually attacking the exposed wood fibers on the surface of the board, creating black mold stain.

  Many people try to use deck cleaners to clean off the mold but it actually comes back many times worse than before.



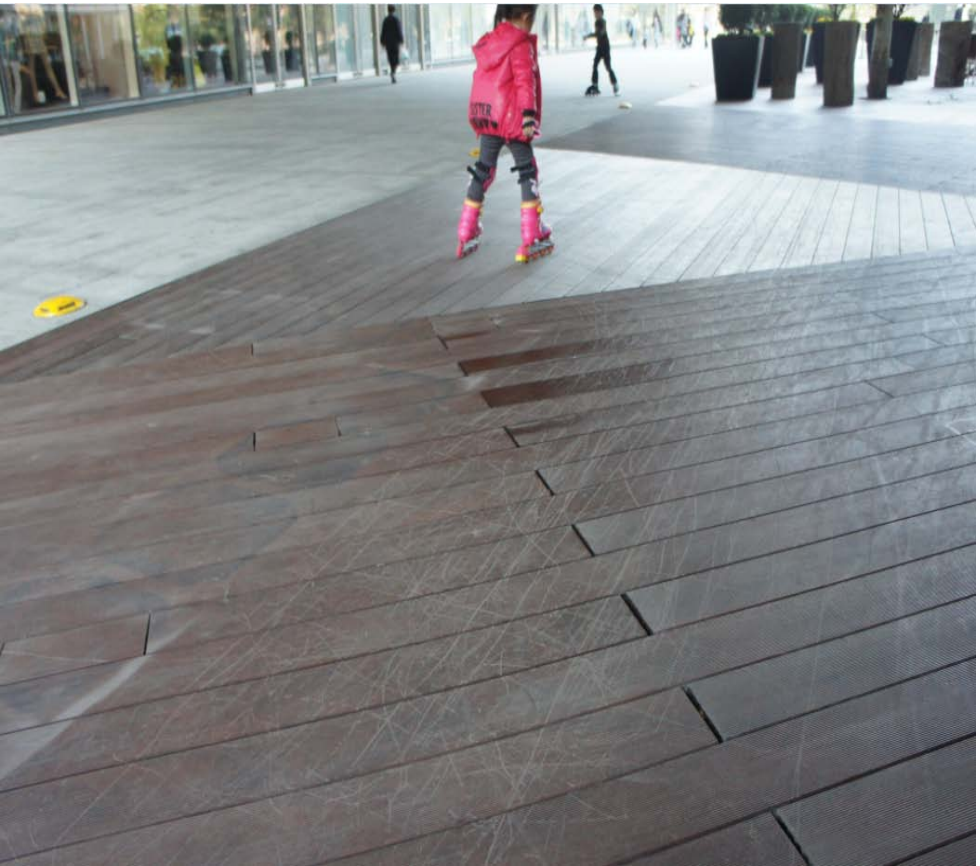

4. Cracking

- Cracking is a break down of the composition of the board due to UV and Water. Some additives will help but eventually the exposed wood fiber of all first generation composite boards will deteriorate and the strength of the board will be weak and started cracking during the process of expansion and contraction.

  This is even more apparent around the area of screw and nail.

5. Scratching

- Composite decking is not a completely scratch proof material.
  The first generation product will scratch with simply using a finger nail.

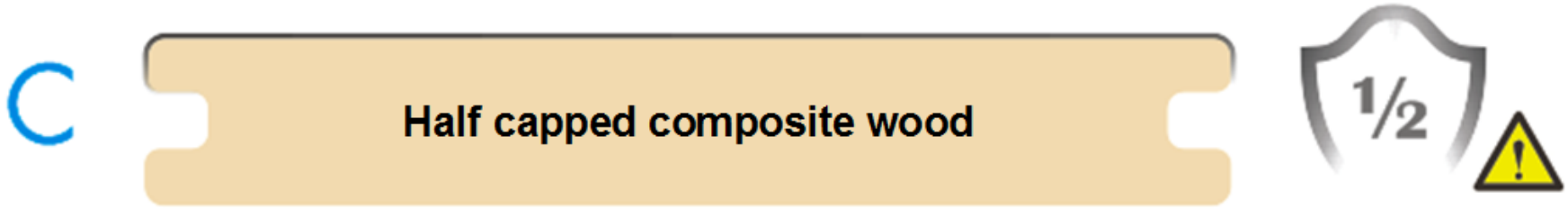


6. Staining

- Without any cap protection, any stains will be absorbed by the wood fiber or penetrate in between the wood fiber and polymer directly and permanently.

Half Shield?

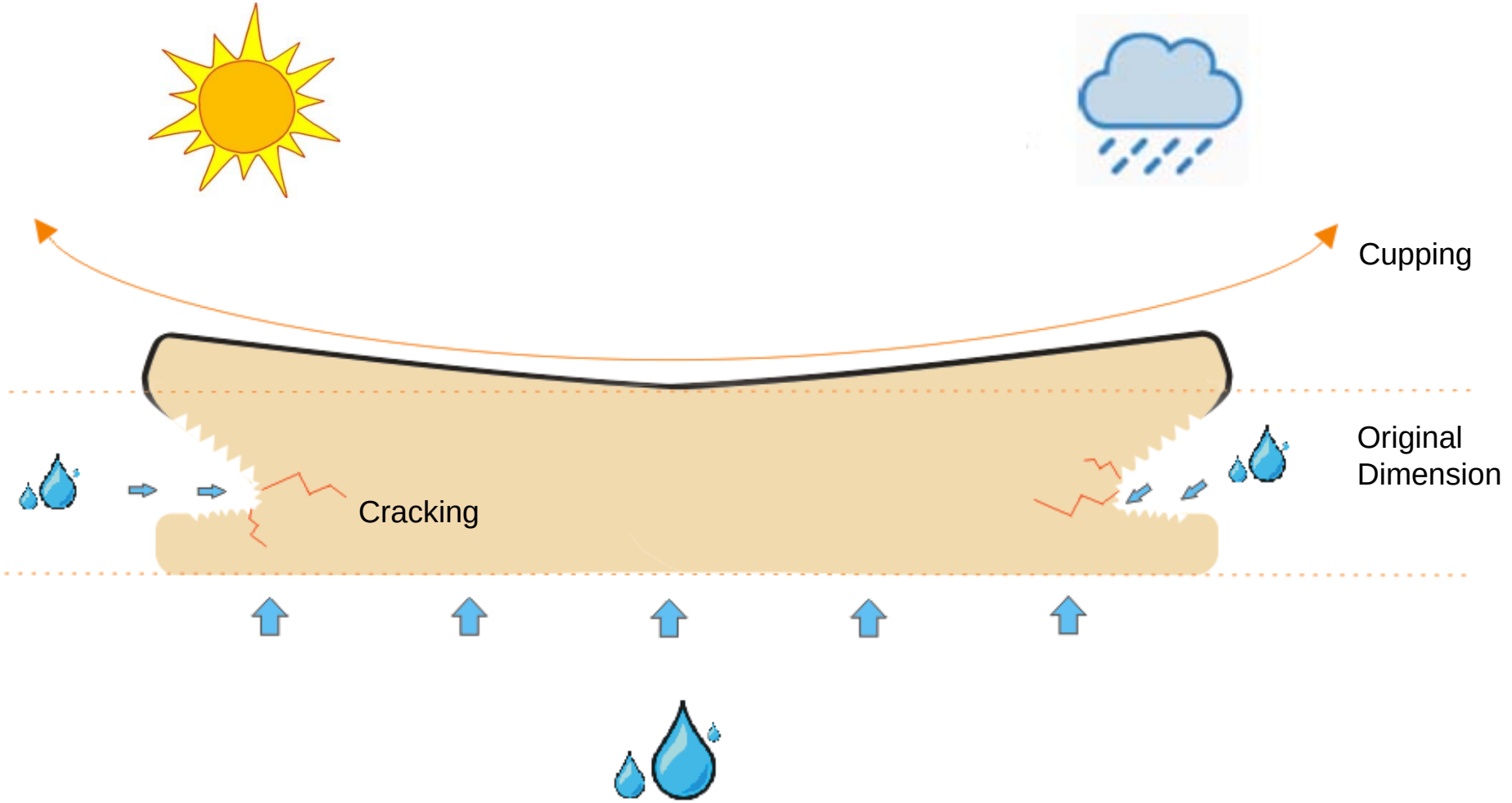
Some capped composite wood is only half capped,
this solves some problems, but other problems occur



- Capping the top half of the board does provides higher stain & scratch resistant, and gives protection against UV from top so it helps to maintain the color in certain period of time.

- However, because the capped layer shield and inner core were made of different materials, so they have different expansion and contraction rate, and also more significantly in this case: the difference in water adsorption rate.

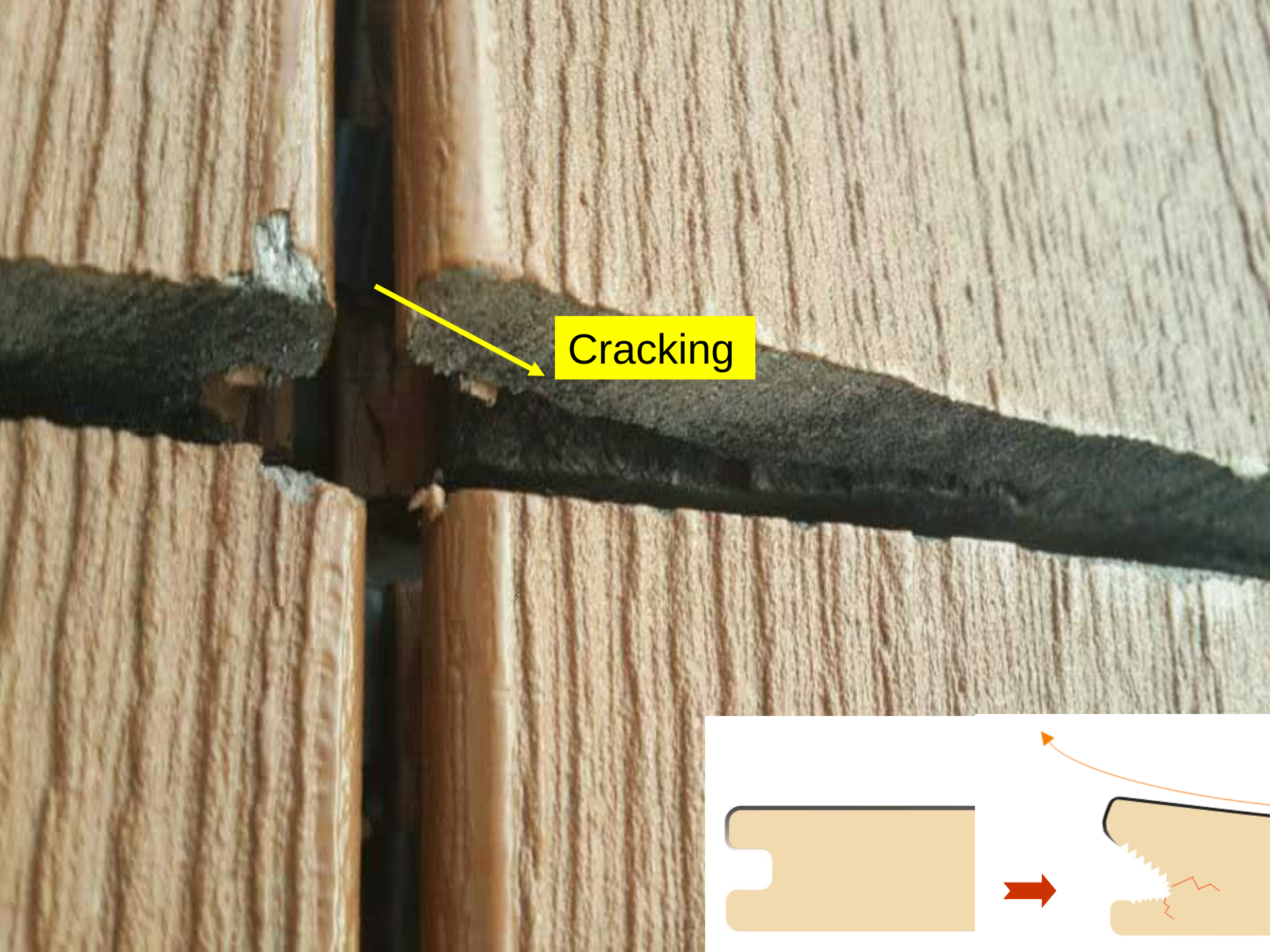
7. Swelling & Cupping



- The shield uses engineering polymer, has extremely low water adsorption rate. The core contains wood power, it swells when exposing to moisture. Since the top layer is capped, the moisture is struck, can not evaporate.

  It gets more severe during summer when temperature is always high.

  When capped layer only covers the top side of the board, the moisture goes from under the board into the core, and cause swelling. The force of contraction pulls the entire top layer from the bottom layer which is holding down by the clip and causes cracking.


Cracking


Cupping

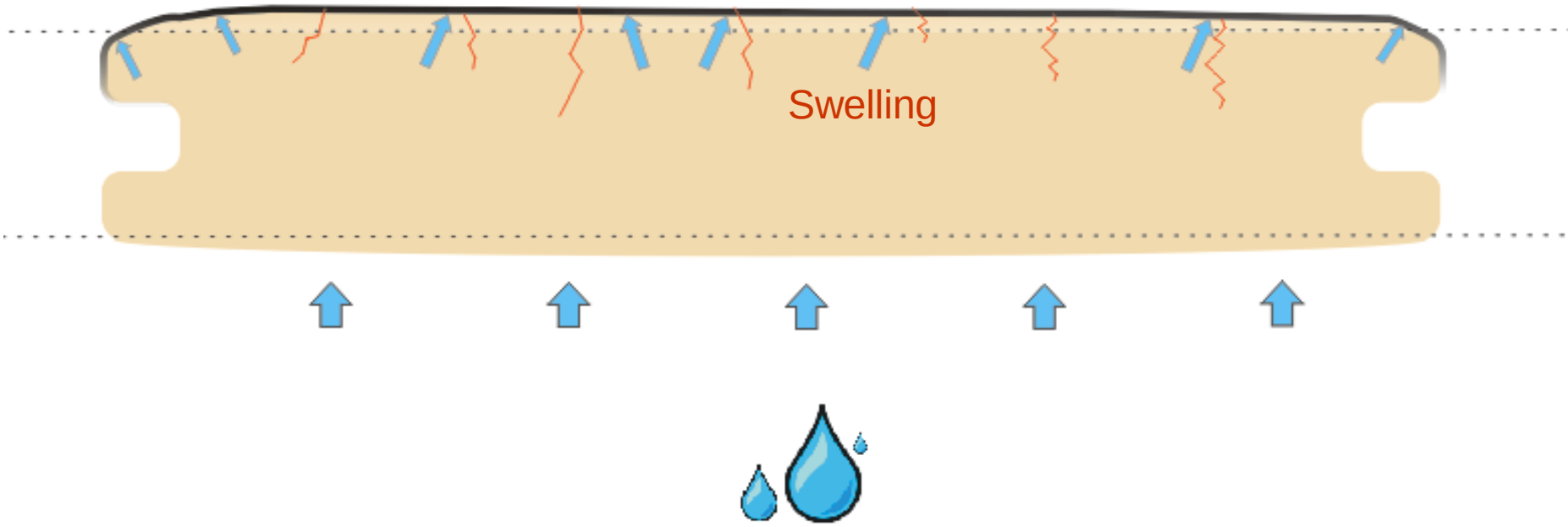

Cupping

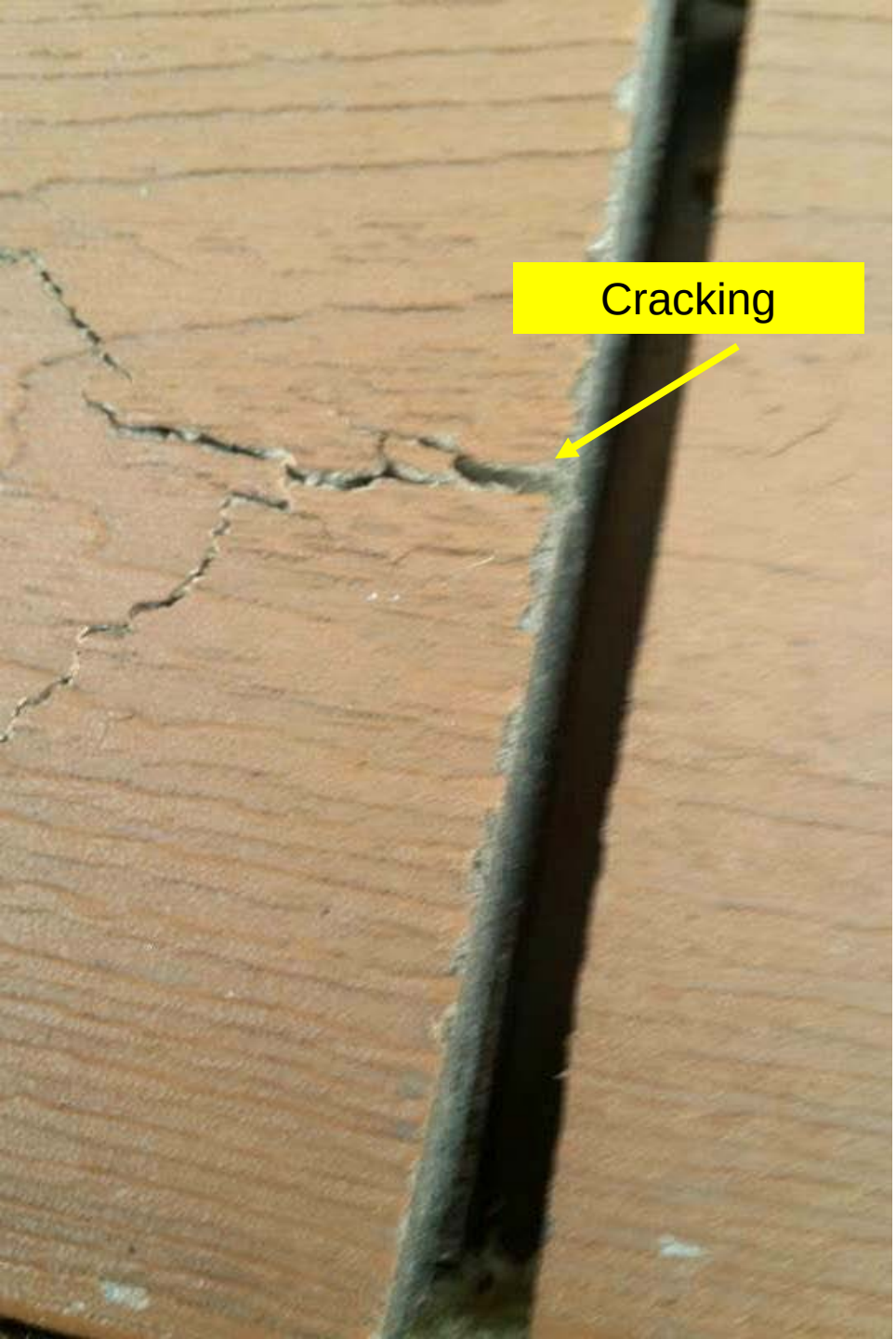

Cupping
Whole project were re installed


Uninstalled deck boards
Cracking

8. Cracking in the cap layer

- Similarly, because the inner core swells and expands. The force push outward and crack the capped layer.




Cracking


Cracking

Shield cut?

Some boards with uncapped groove,
by cutting out the groove on both sides of the board,
or were unable capped technically.

B

Groove was cut out, not completely capped

- With uncapped groove, the moisture can still go into the core from the groove along the entire board, so the swelling, cupping and cracking hazards are still potentially existing. During the groove cutting, the capped layer could be damaged.

360 degree complete capped shield!

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A

360 degree complete protection all around the board including tiny area of curvature and groove area, this is the only way to protect the board from UV, water, insects and any other bacteria attacking the core.

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UltraShield® Advanced Capped Composite Material

<u>has a strong & durable polymer shield capped the core 360 degree.</u>

- The Core is made of wood fiber, PE polymer and additives .
- The Shield is made of special engineering grade polymer and additives with extreme low water penetration.

The Shield prevents moisture penetration inside the core, avoiding problems like:

× No Rot
× No Split & Crack
× No Fungus & Mold
➔ Durable and longer life span to keep your family members healthy & safe

Moreover, as the strong and tough Shield, it gives a maximum protection with:

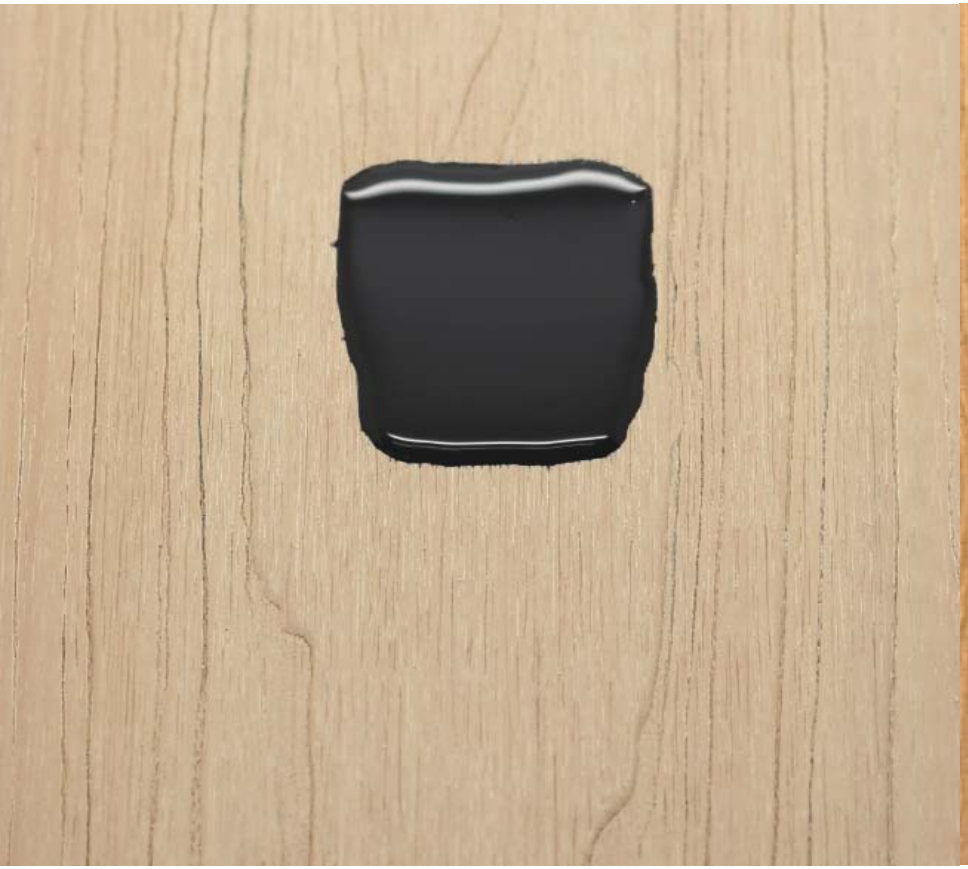
√ Stains Resistance
√ Scratch Resistance
√ No need to paint
➔ Maintain the pleasant outlook for years to come with very low maintenance, and will save your time and money

3. Focus in testing capped composite wood

3.1 Stain Test
3.2 Scratch Test
3.3 Abrasion Test
3.4 UV Test
3.5 Boiling Test

3.1 Stain Test

Step 1. Stain with black ink



UltraShield®

Conventional composite wood

Step 2. Wipe out half of the ink

UltraShield®

Conventional composite wood

Step 3. Wash off by water

UltraShield®

Conventional composite wood

Last Step: Dry and see the result

UltraShield®： No penetration through the top layer and no stain left

Conventional： Stain remains

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3.2 Scratch Test

- Use 1 mm needle
- Test scratch damage under 8N-20N pressure

Test Standard：FLTM BO 162-01

Original

UltraShield®

Conventional composite wood

NewTechWood®

UltraShield® 20N: No obvious mark

Conventional: 8N: Mark appears

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3.3 Abrasion Test

- Testing: 750g Weight,
  60 turns/min, 1000 turns

Test Standard：ASTM D4060

Original

UltraShield®

Conventional composite wood

Scratch mark and the wore off powder weight after test

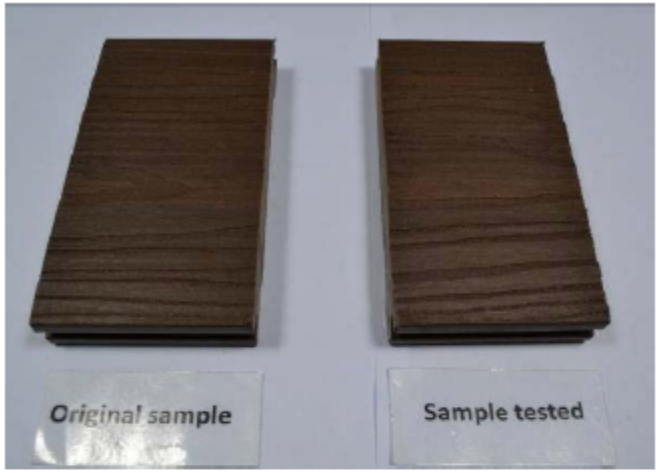
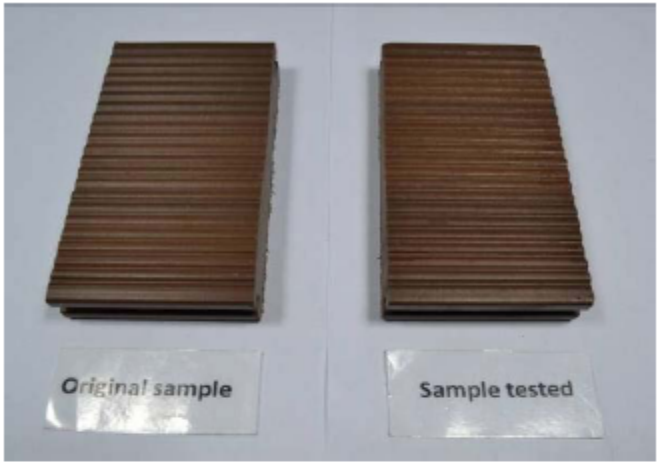
UltraShield® 23mg

Conventional composite wood 81mg

3.4 UV Test

- QUV chamber test up to 3000 hours，Observation & record in every 500 hours

UltraShield® 500 hrs： Delta E ： 0.65 - 1.25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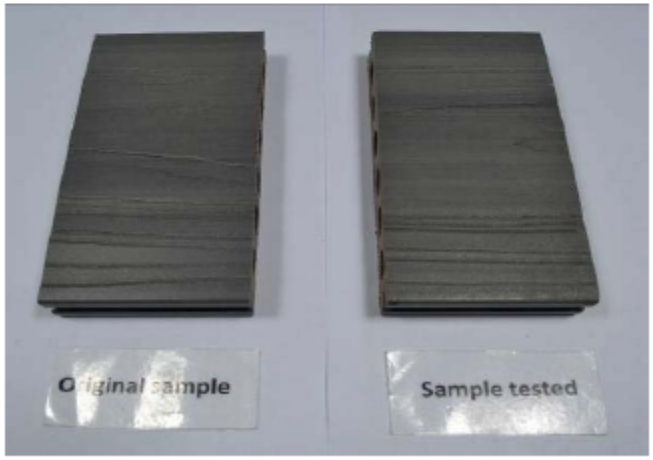
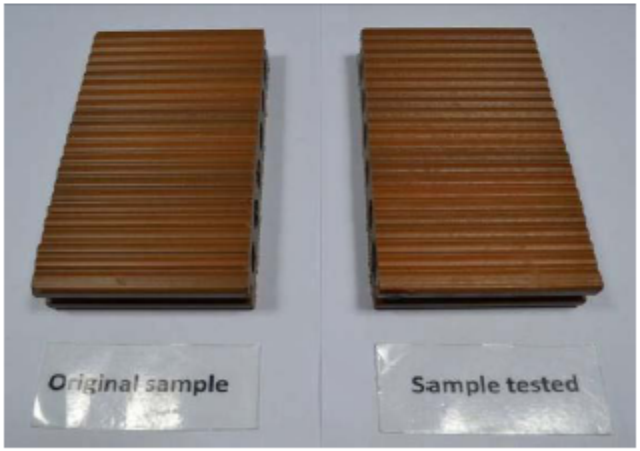
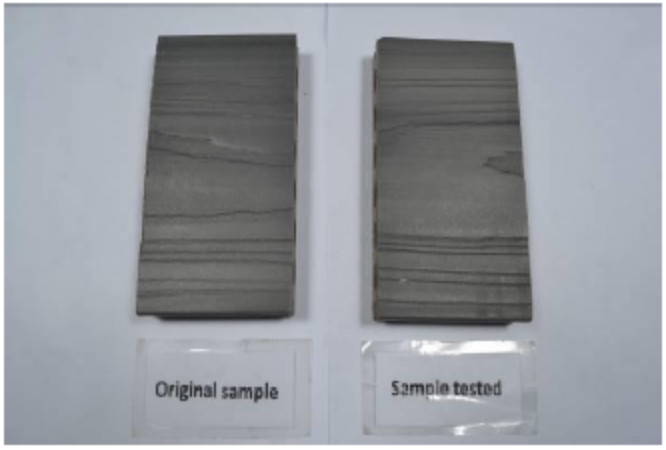
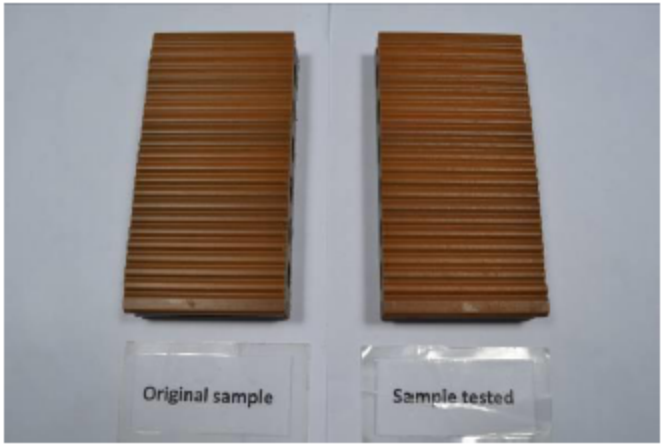
	
Model: UH02. After 500 h test, Gray Scale=4-5, △E*=0.83.	Model: UH07. After 500 h test, Gray Scale=4-5, △E*=1.23.

UltraShield® 1000 hrs： Delta E ： 0.92 - 1.41

	
Model: US01. After 1000 h test, Gray Scale=4-5, ΔE*=0.92	Model: US02. After 1000 h test, Gray Scale=4-5, ΔE*=1.33.
	
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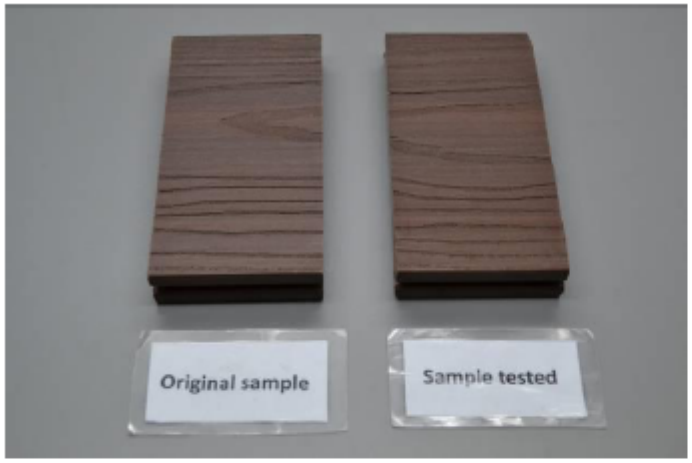
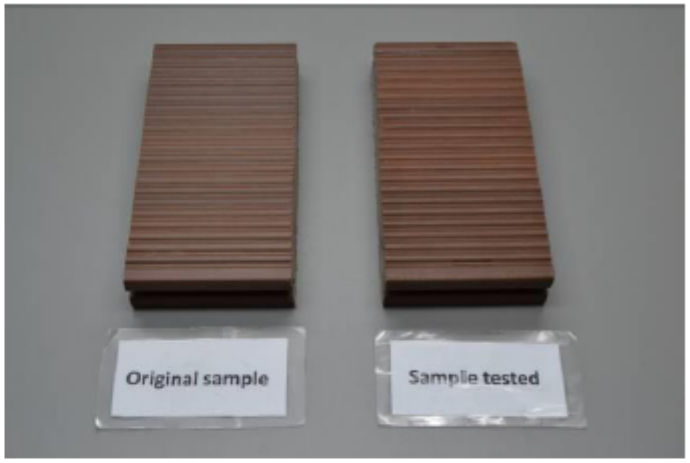
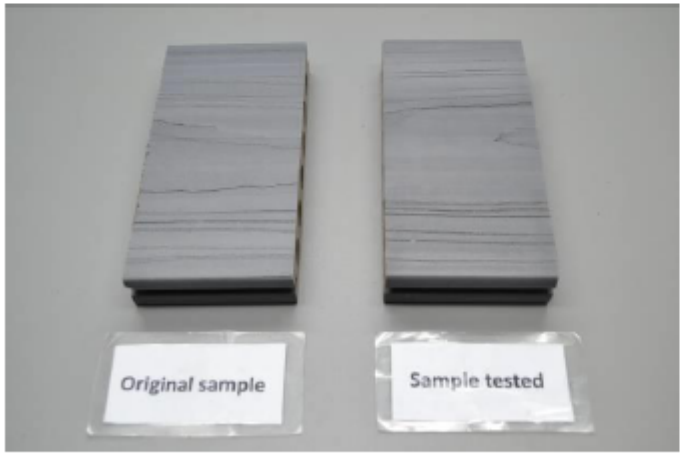
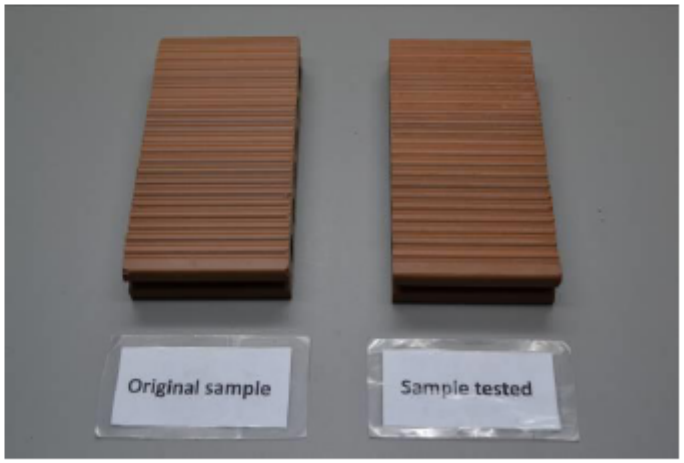
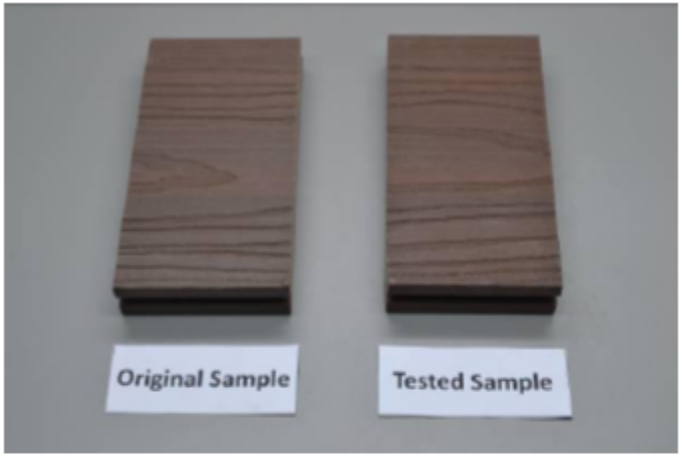
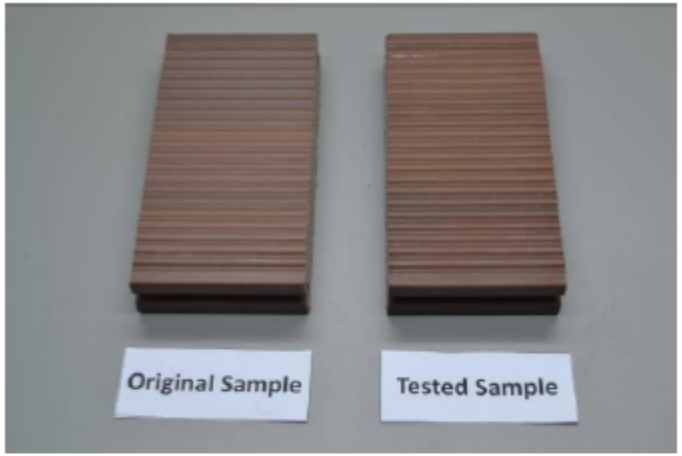
UltraShield® 1500 hrs： Delta E ： 1.45 - 1.63

	
Model: US01. After 1500 h test, Gray Scale=4, Δ E*=1.51	Model: US02. After 1500 h test, Gray Scale=4, Δ E*=1.60
	
Model: UH02. After 1500 h test, Gray Scale=4, Δ E*=1.45	Model: UH07. After 1500 h test, Gray Scale=4, Δ E*=1.63

UltraShield® 2000 hrs： Delta E ： 2.55 – 3.54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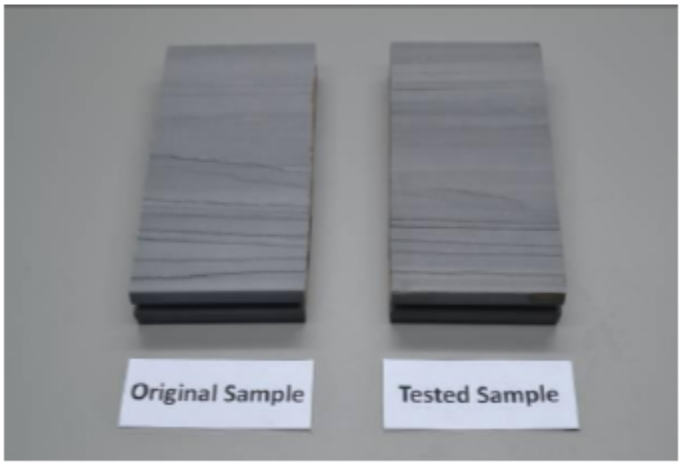	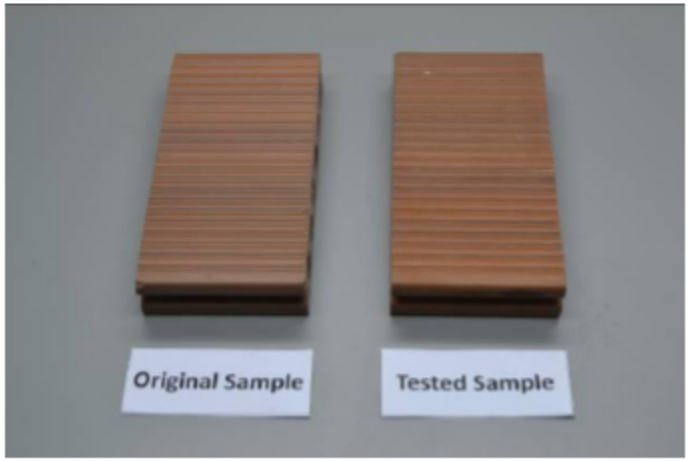
Model: UH02. After 2000 h test, Gray Scale=3, ΔE*=3.16	Model: UH07. After 2000 h test, Gray Scale=3, ΔE*=3.21

UltraShield® 2500 hrs： Delta E ： 2.72 - 3.63

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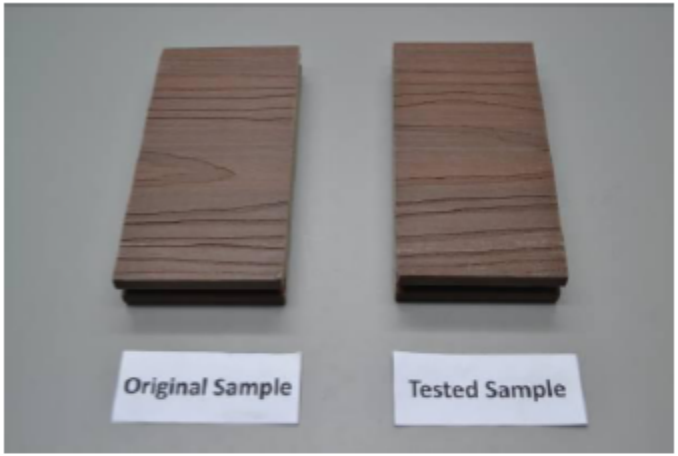
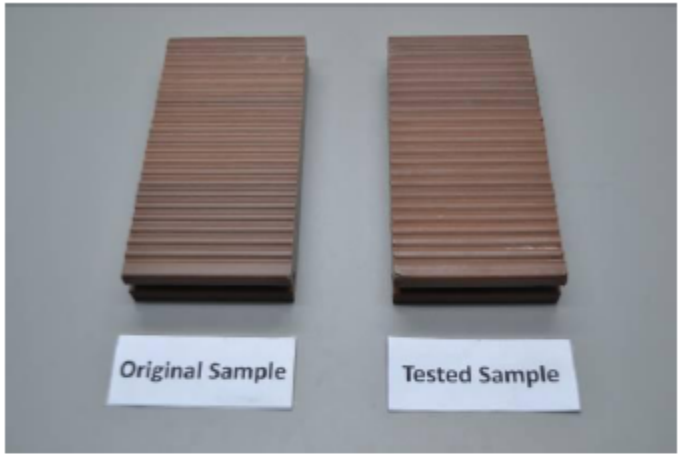
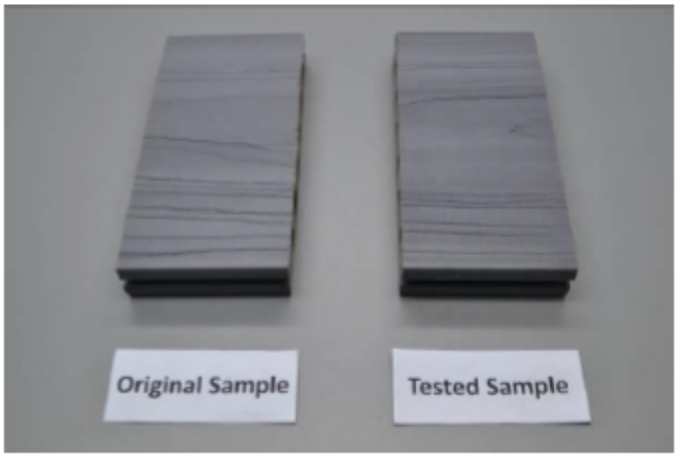
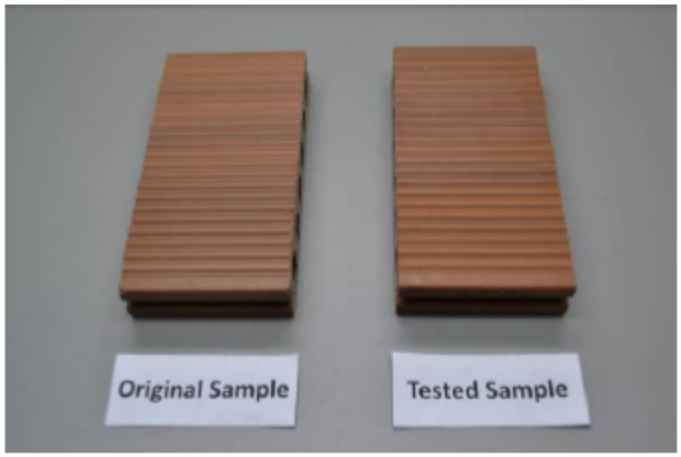
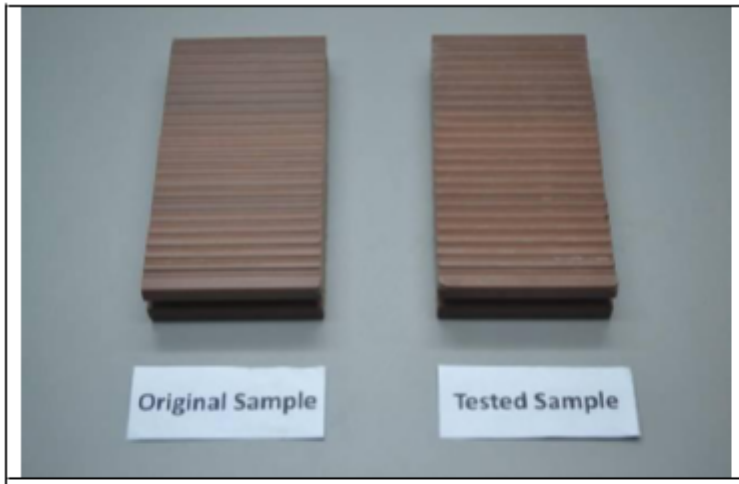
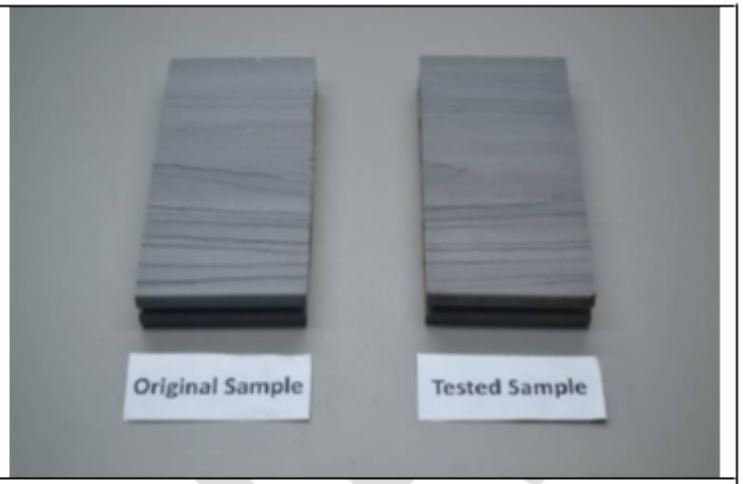
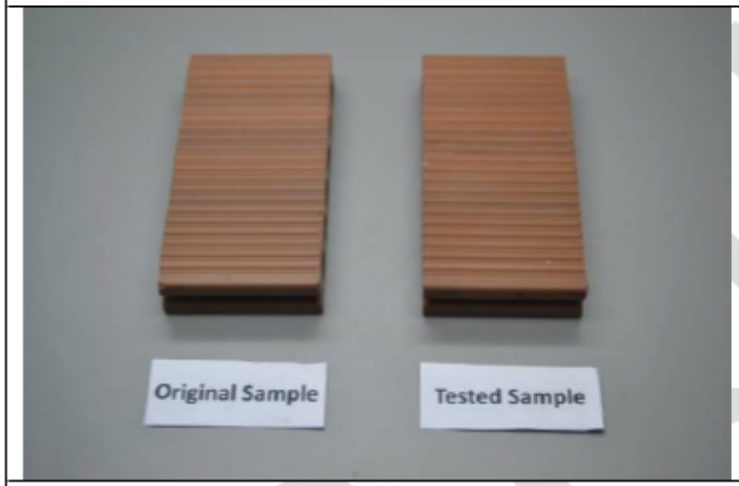
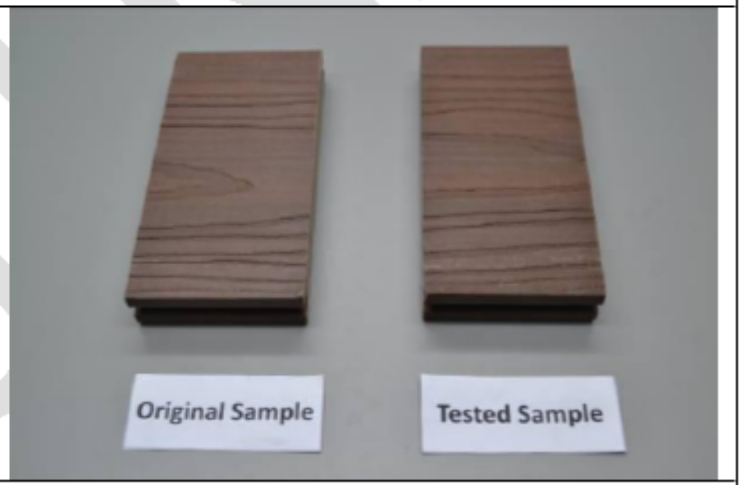
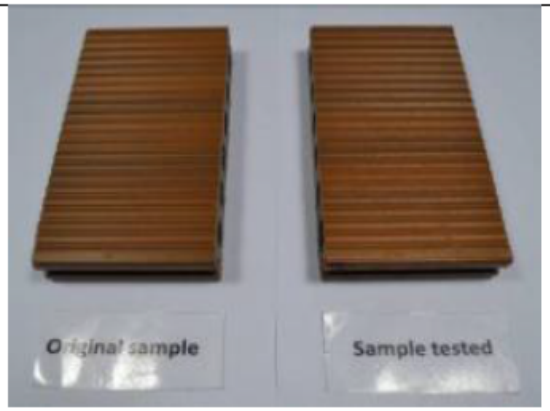
	
Model: US01. After 2500 h test, Gray Scale=3-4, ΔE*=2.72	Model: US02. After 2500 h test, Gray Scale=3, ΔE*=3.63
	
Model: UH02. After 2500 h test, Gray Scale=3, ΔE*=3.31	Model: UH07. After 2500 h test, Gray Scale=3, ΔE*=3.47

UltraShield® 3000 hrs： Delta E ： 2.72 – 3.75

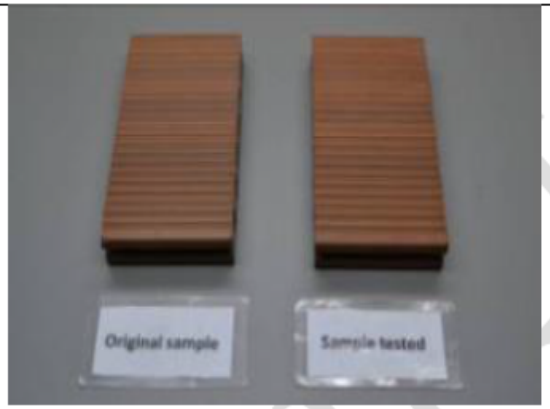
	
Model: US02, Part showed some color change. There was no other visible surface damage. After 3000 hours test, ΔE*=3.75 Gray Scale 3.	Model: UH02, Part showed some color change. There was no other visible surface damage. After 3000 hours test, ΔE*=3.56 Gray Scale 3.
	
Model: UH07, Part showed some color change. There was no other visible surface damage. After 3000 hours test, ΔE*=3.64 Gray Scale 3.	Model: US01, Part showed some color change. There was no other visible surface damage. After 2500 hours test, ΔE*=2.72 Gray Scale 3-4.

Model: UH07

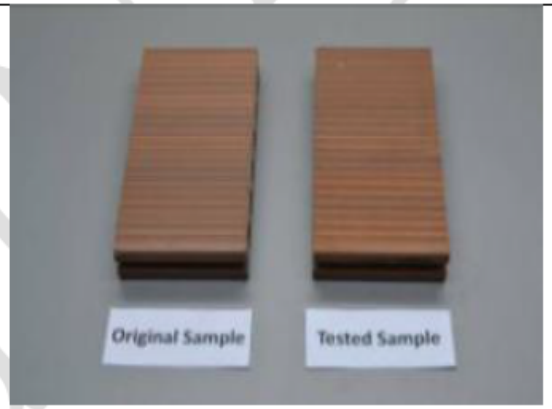


After 500 hours test, Grey Scale 4-5, ΔE*=1.23

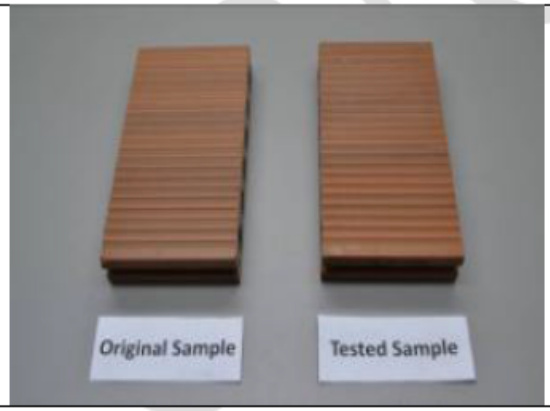
After 1000 hours test, Grey Scale 4-5, ΔE*=1.41



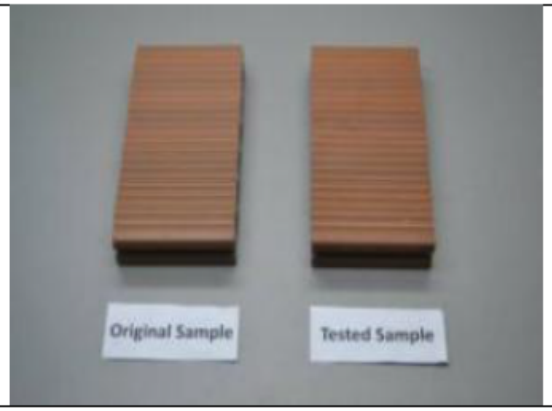
After 1500 hours test, Grey Scale 4, ΔE*=1.63



After 2000 hours test, Grey Scale 3, ΔE*=3.21



After 2500 hours test, Grey Scale 3, ΔE*=3.47



After 3000 hours test, Grey Scale 3, ΔE*=3.64

Tested in a QUV chamber for 3000 hours, no visible color change can be observed (Delta E <4.0)

3.5 Boiling Test

1. Put the test samples in the container, water need to be exceed sample 5mm or above

2. Turn on the test machine, reach 100℃ within 0.5 hr

3. Take out the sample after every test period and record the duration.The duration should be recorded after the temperature reach 100℃

4. Repeat procedure 1-3 on the second day.

- Boil the board up to 80 hours or more.

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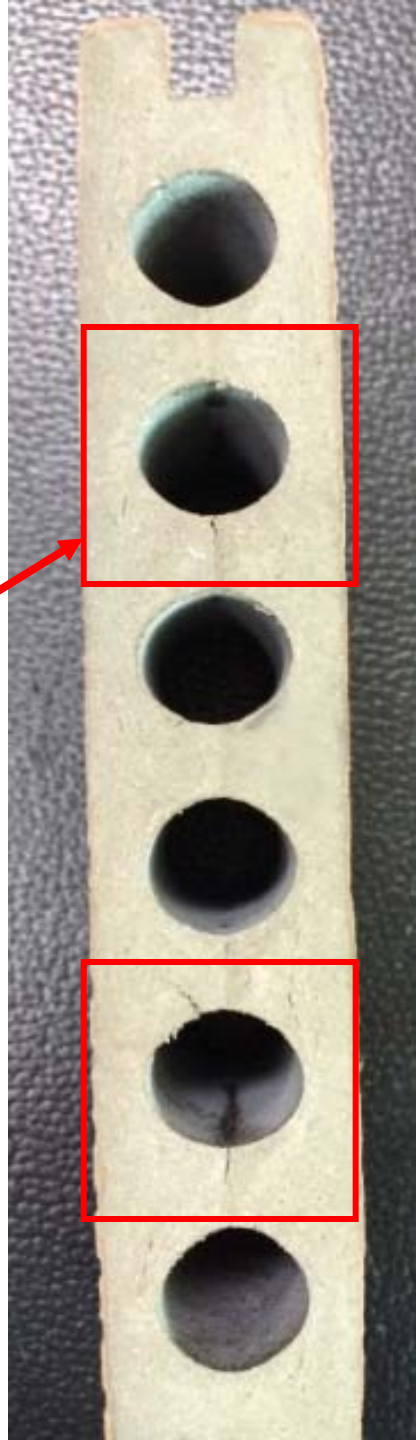
80hr 90hr

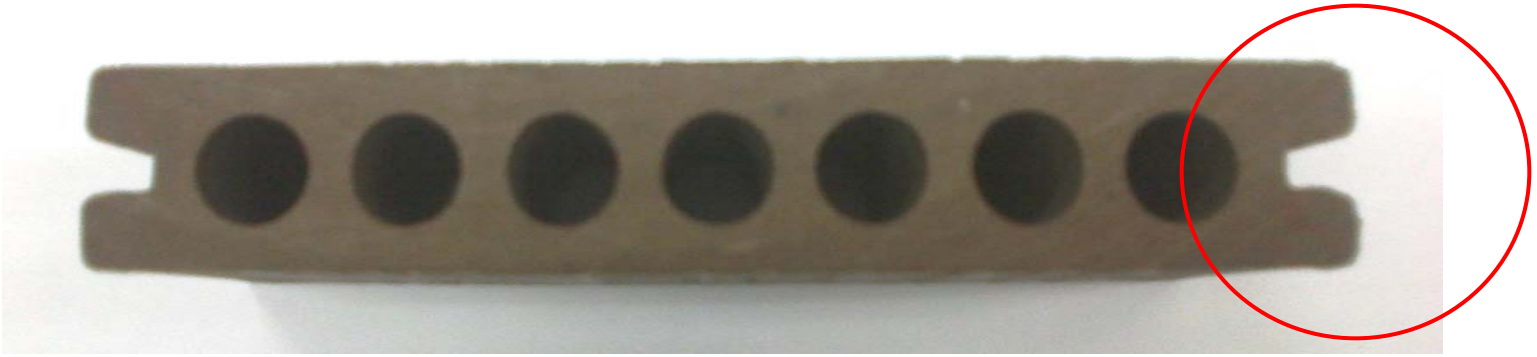
Picture shown: UltraShield® after 90 hrs boiling test, no separation between the capped layer and the core, no damage and no cracking



Some fully capped composite wood shown cracking in both the capped layer and the core after 15 hrs boiling test:

The shield shown 2 cracks, 30mm

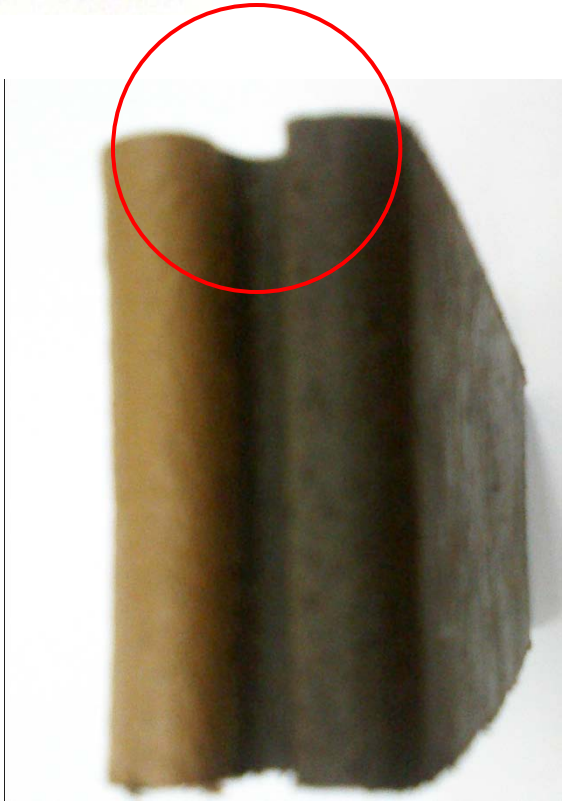
The core shown 2 cracks, 3-5mm



Some fully capped composite wood shown separation after 41 hrs boiling test:
Picture shown separation, 2-3mm

Some groove cut capped composite wood shown separation after 18.5 hrs boiling test:
Picture shown 3 spots of separation at the grooves, 2-5mm
And cracking in the core 2-4mm

Some half capped composite wood shown swelling and total separation between the core and the shield start from the groove after 107.5 hrs boiling test.



4. The color and surface treatment

Besides the durability, the colors is a very important element for the growth of capped composite.

NewTechWood UltraShield currently has 18 colors and will continue develop more colors

NewTechWood

UltraShield® Naturale™

18 Colors:


Stone Gray (ST)
Mirage Gray (MG)
Silver Gray (SI)
Light Gray (LG)
Charcoal (CH)
Merbau (MB)
Sand (SD)
Antique (AT)
Smoke White (SW)
Sky Blue (SB)
Swedish Red (SR)
Spring Green (SG)

NewTechWood

UltraShield® Naturale™

Pattern Choices

NewTechWood

Ultra Protection

+

Superb
colors and patterns

↓

UltraShield® Naturale™