NewTechWood®

Why NewTechWood® with UltraShield?

v20200610 AUS

Outline

UltraShield®

Why insist to cap completely around ?

To make the board capped 360 degree around :

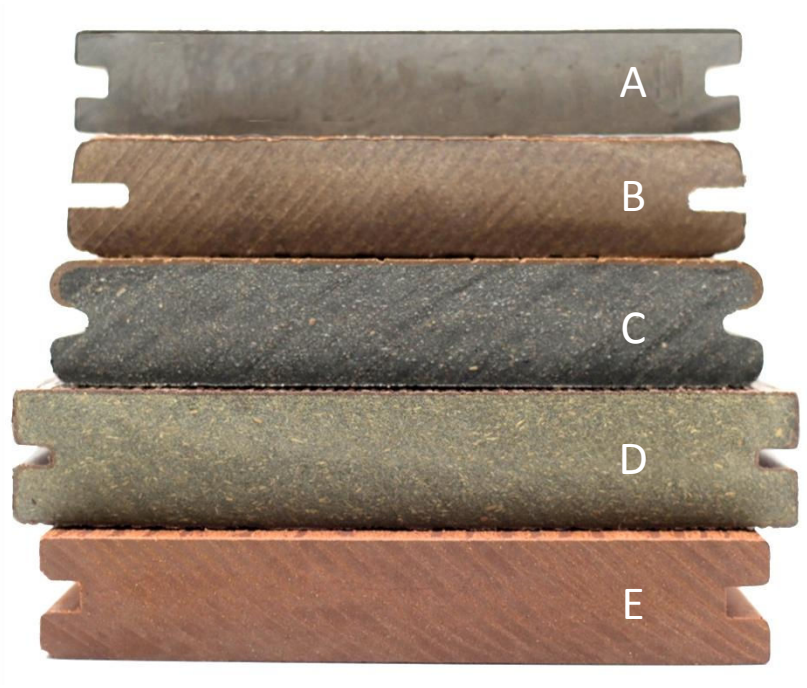
1. It will give the board maximum protection and STOP all the first generation product problems and also the non-360 capped board problems such as :
   a) Cupping , b) Cracking and c) Swelling

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

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.



A

Capped 360 Degrees

B

Groove was cut out, not completely capped

C

Half capped composite wood

D

Cap layer contains wood powder

E

Non capped, known as first generation

NewTechWood

Picture shown: Type A: 360 degree completely capped, including groove

2. Potential problems for non capped composite wood product

No Skin?

E **Non capped, known as first generation** 0

First generation (non capped) composite wood has no cap layer to protect the core.

D **Cap layer contains wood powder** 0

Some capped composite wood products contain wood powder in their cap layer, which means that wood powder is still exposed to the elements and can still succumb to the problems of the first generation.

Potential Problems

1. Crumbling
2. Colour Fading
3. Fungus & Mould & Mildew
4. Cracking
5. Scratching
6. Staining

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

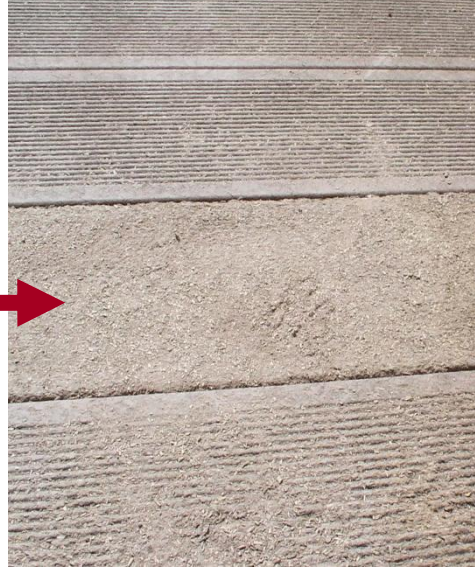
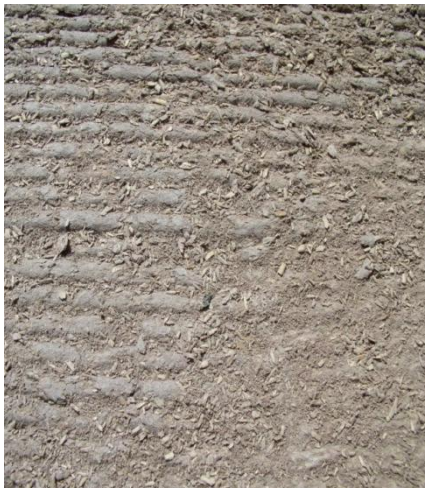
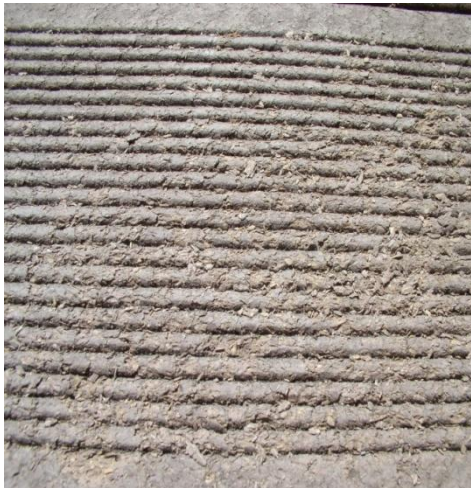
Not only the colour will be faded out, the structure and composition will be degraded or even destroyed.

1. Crumbling

- When the first generation composite boards are exposed to the UV and water, it begins to decompose. This is due to an improper amount of bonding agent and antioxidant added to the composite material.

Ultimately, the wood fibre absorbs moisture with UV together which causes composite decking to decay, crumble, deteriorate and rot.

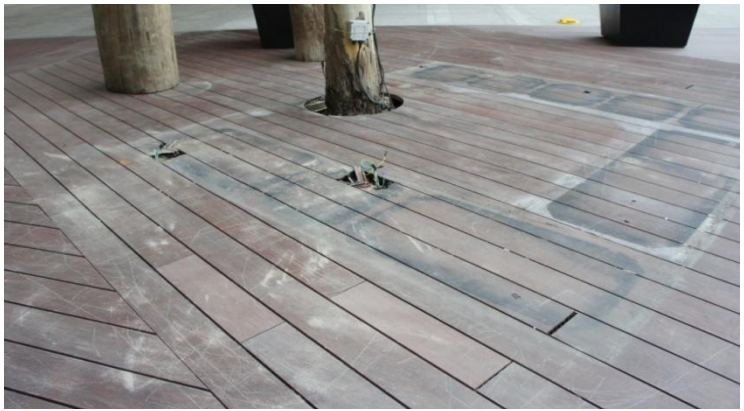


2. Colour Fading

- The reason for colour fading comes from the wood fibre content. Wood naturally fades if not protected. Most of the time manufacturers brush their boards which damages the plastic, allowing the wood fibres to be exposed to the surface. Inconsistent fading occurs due to the manufacturer's inability to control the consistency of the colourant and raw materials being added.

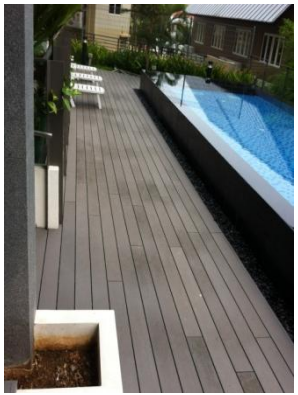
Colour difference - many decks were faded with uneven colour resulting in some boards being lighter and others appearing darker.



3. Fungus, Mould, Mildew

- Fungus, mould, and mildew problems are usually found in climates with extreme humidity or climate change. When not protected by a sealant or treated, the wood fibres are attacked when they are exposed to the elements.

Many people have tried to use deck cleaners to clean off the mould, but once the layer that is sealed/protected by the cleaner wears off, the mould will just attack the other layers below.




4. Cracking

- Many manufacturers add calcium / filler to their product to enhance the stiffness of the board, but it makes the board more brittle. Therefore, when installers try to drill into the board there is a potential that it might crack.

5. Scratching

- The first generation composite's scratch resistance is very poor and this is due in part because of the wood fibres. Wood fibres inherently have a low scratch resistance and when the manufacturer brushes/sands the board, it creates a coarse effect on the surface, allowing for even less scratch resistance.

6. Staining

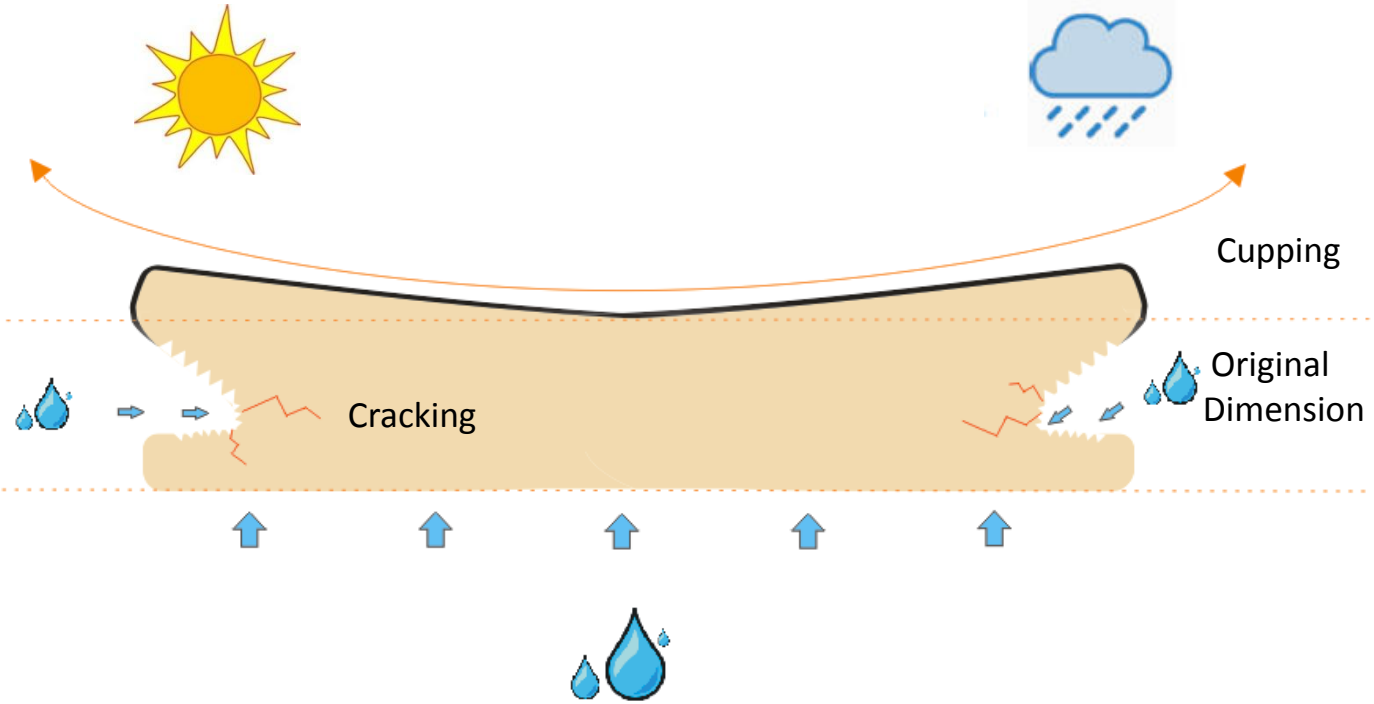
- Without any cap protection, any stains will be absorbed by the wood fibre or penetrate in between the wood fibre and polymer directly and permanently.

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 provide higher stain, scratch, and UV resistance, however, the underside and grooves of the board are exposed to the elements and that creates dry and wet effects on the top and bottom.

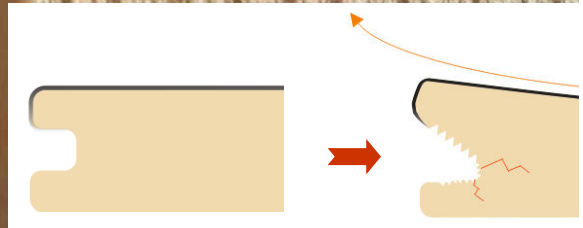
7. Swelling & Cupping



- The shield uses a virgin engineering grade polymer that has an extremely low water absorption rate. The shield on a half capped board is only protecting the top, meaning that the bottom is still exposed in a similar fashion as the first generation composite.

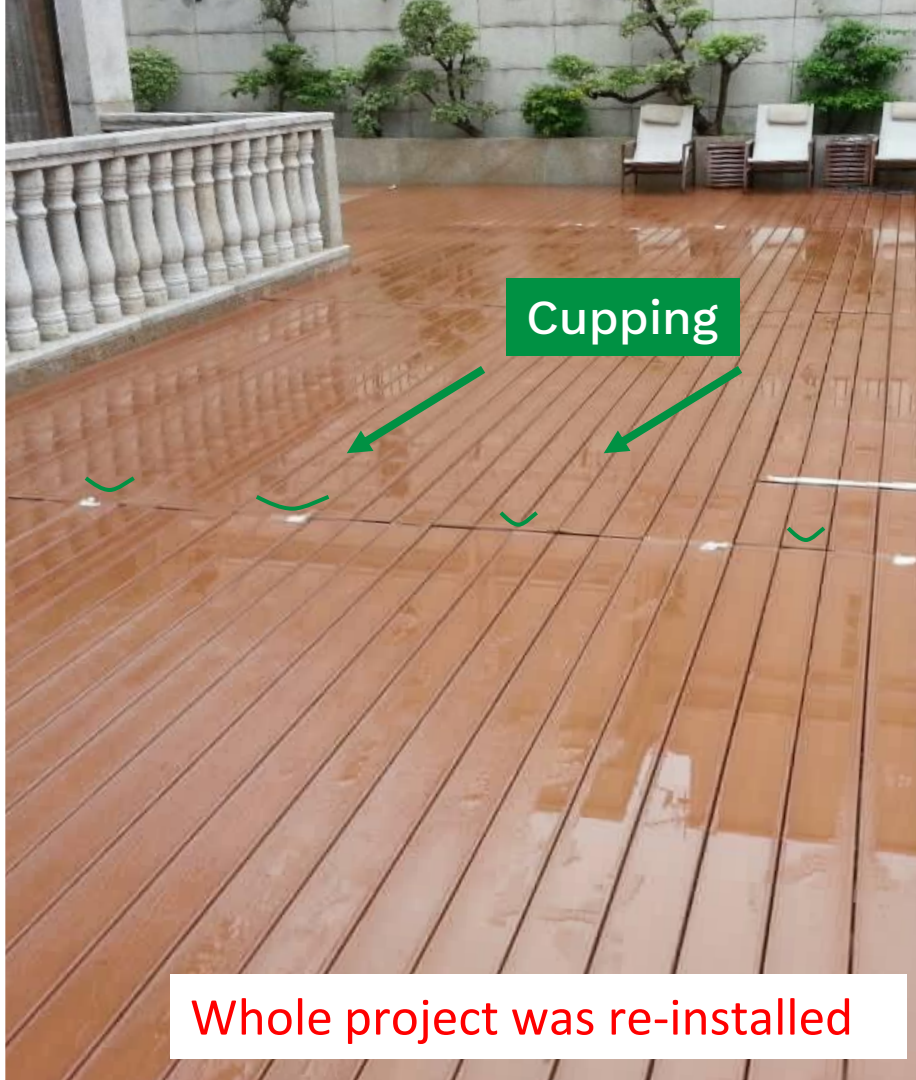
- Therefore, on a very humid day, the bottom will continually absorb moisture and the top will be almost completely dry. This creates a cupping/ twisting effect on the board similar to real wood. The force of this effect can be so strong that it actually tears/splits the core in half as shown below.

Cracking



Cupping

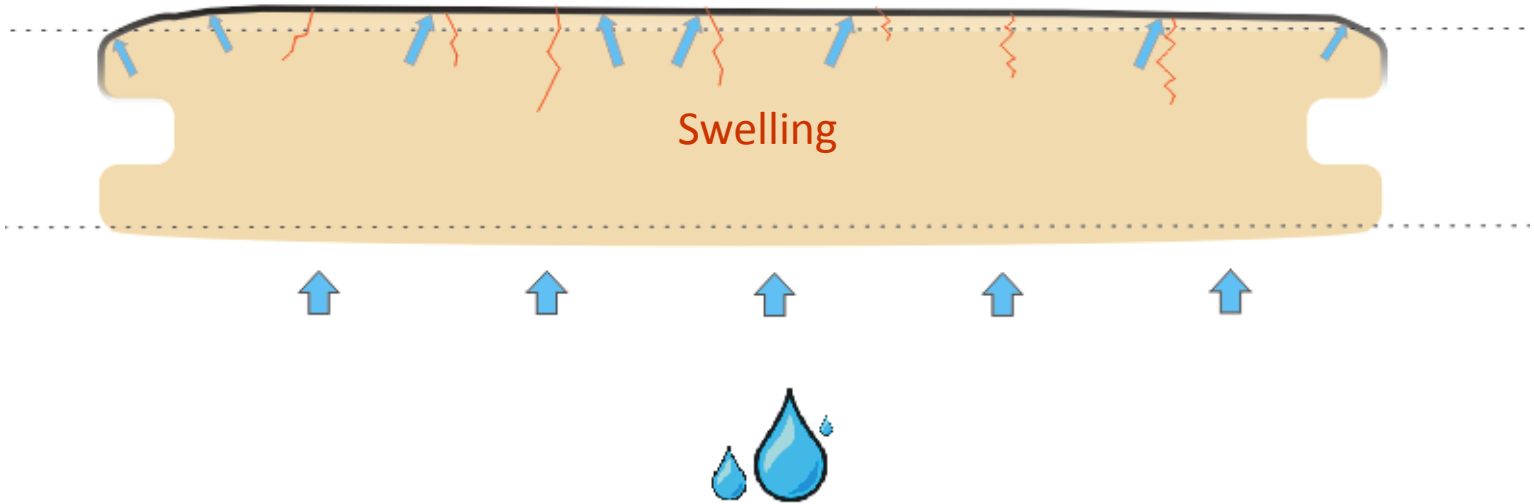

Cupping

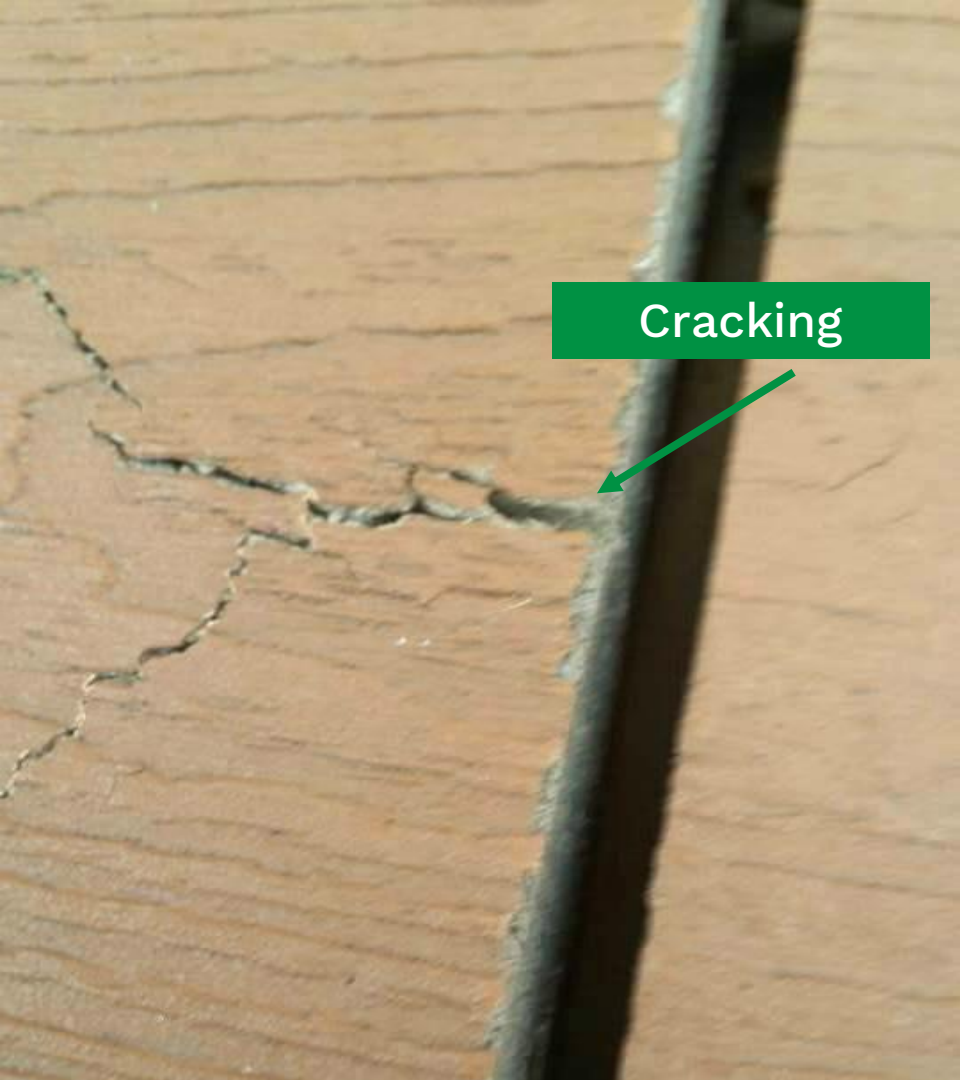

Cupping
Whole project was re-installed

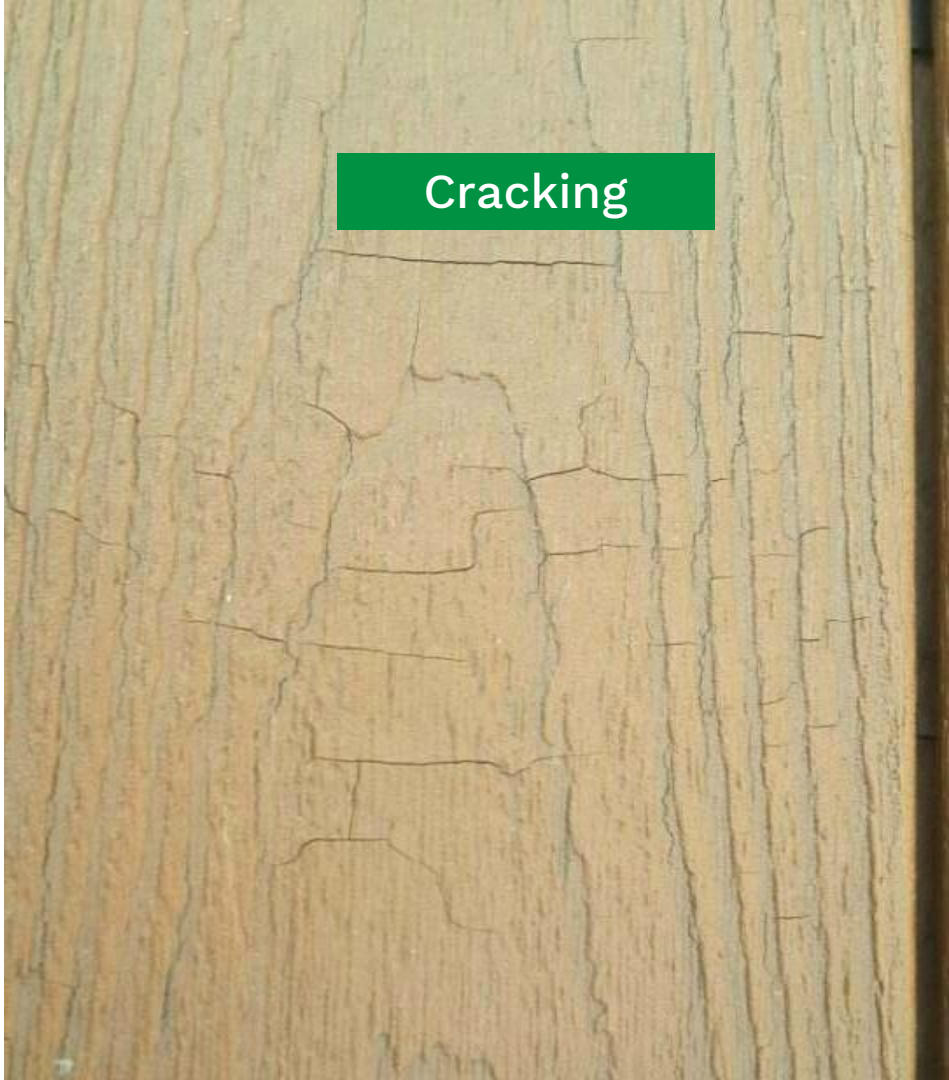

Uninstalled deck boards
Cracking

8. Cracking in the cap layer

- As the inner core continues to gain moisture, the force could get so strong that it tears the cap layer as well.




Cracking

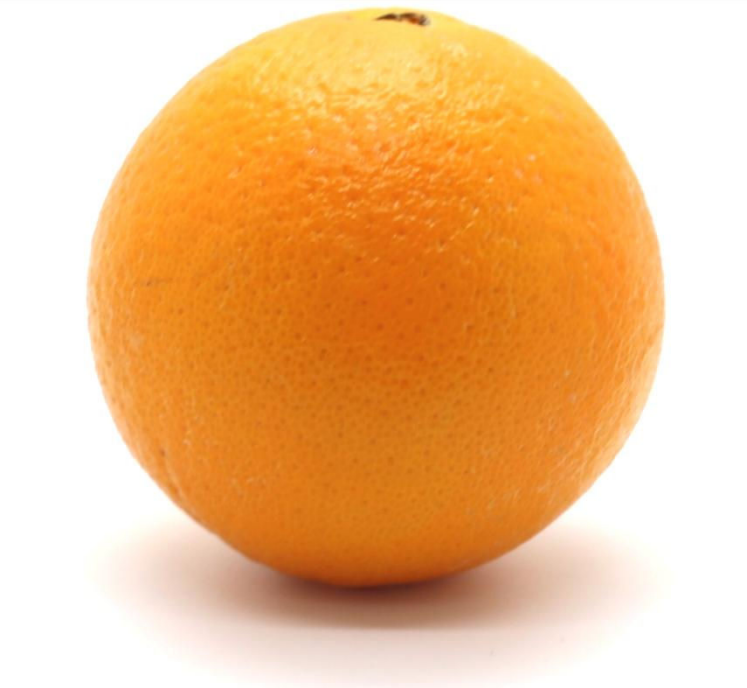

Cracking

Shield cut?

Some manufacturers extrude a fully capped board and then cut the grooves on both sides to cut costs. (One mould to do two profiles, grooved and ungrooved). The other reason could be that technically, they are not as advanced in mould designing.

B **Groove was cut out, not completely capped**

- A board with an uncapped groove still allows moisture to be absorbed into the core through the entire length of the board. Therefore, there is a potential for swelling, cupping, and cracking to exist over time.



360 degree capped shield!

Capping 360 degrees provides complete protection all around the board and even in the groove of the board. This is the only way to completely protect the board from UV, water, insects, and any other mould/mildew from attacking the core.

Note: The core is still susceptible to the outside elements, so it is recommended to either use a sealant or end caps to cover up any ends that are not protected.

UltraShield® Advanced Capped Composite Material

has a strong and durable polymer shield capping the core 360 degrees.

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

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

× Rot
× Split & Crack
× Fungus & mould**

➔The Shield is durable and gives a longer life span so that you can enjoy your time on your deck with minimal maintenance.

**** Note: mould can still occur on the board through outside substances such as food, tannins, etc. that are left on the surface of the board if not cleaned within a reasonable amount of time. Please read the care and cleaning guide to get more information.**

The Shield gives maximum protection against:

√ Staining
√ Fading
√ Mould / Mildew
√ Scratches

➔ The shield maintains a pleasant look for years to come and needs no painting, sanding, or oiling of any kind.

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
3.6 Ash Content Test

3.1 Stain Test

1 Stain with black ink

UltraShield®

Conventional composite wood

2 Wipe off half of the ink

UltraShield®

Conventional composite wood

3 Wash off by water

UltraShield®

Conventional composite wood

4 Dry and see the result

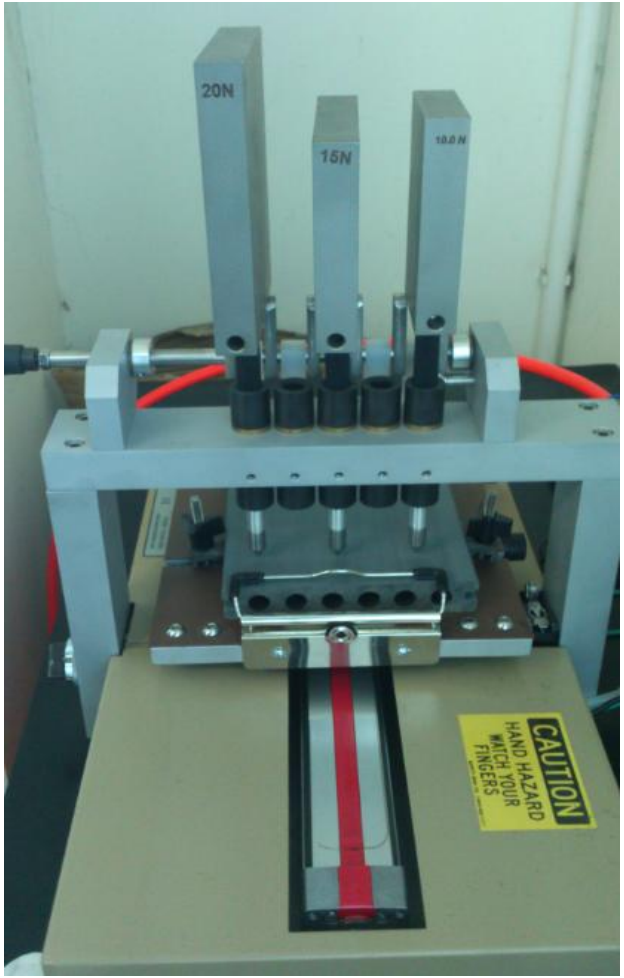
UltraShield®:

No penetration through the top layer and no stain left

Conventional:

Stain remains

NewTechWood®



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

UltraShield® 20N: No obvious mark

Conventional 8N: Mark appears

3.3 Abrasion Test

- Testing: 750g Weight,

  60 turns/min, 1000 turns
- Test Standard：ASTM D4060

Original

UltraShield®

Conventional composite wood

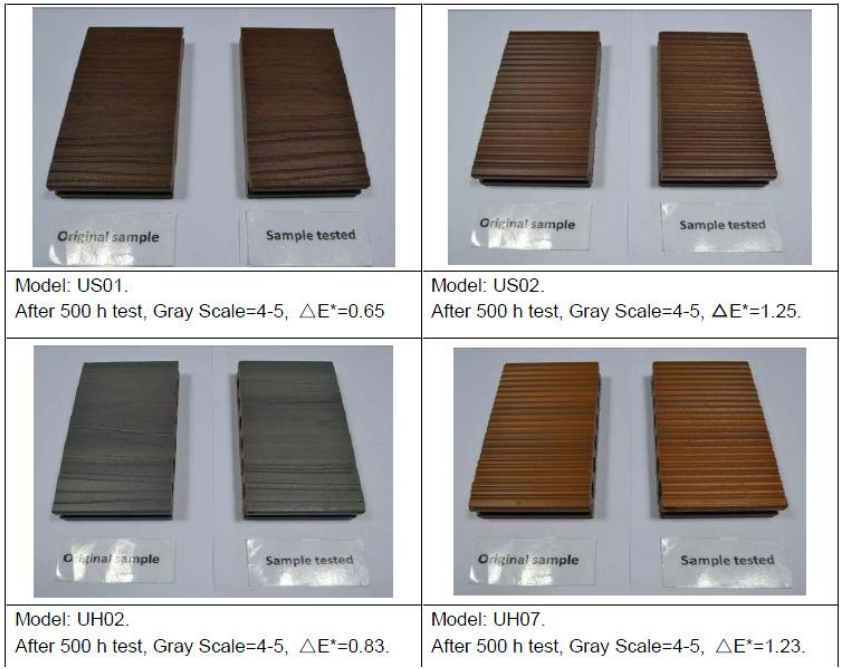
Scratch mark and the wore off powder weight after test

UltraShield® 23mg

Conventional composite wood 81mg

3.4 UV Test

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

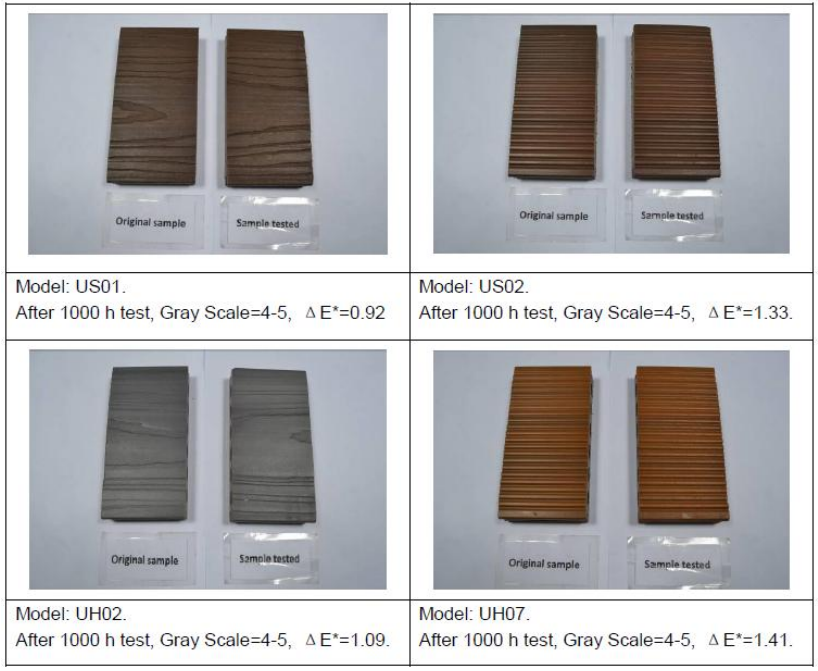


Model: US01.
After 500 h test, Gray Scale=4-5, △E*=0.65

Model: US02.
After 500 h test, Gray Scale=4-5, ΔE*=1.25.

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.



Model: US01.
After 1000 h test, Gray Scale=4-5, ΔE*=0.92

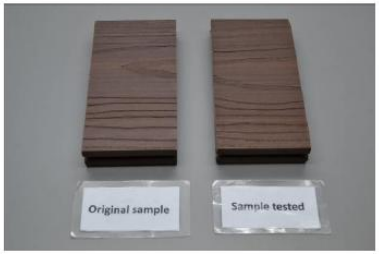
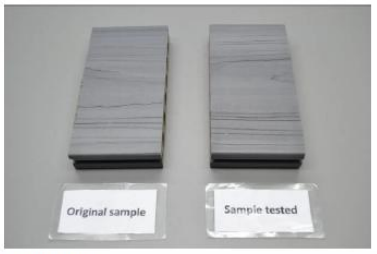
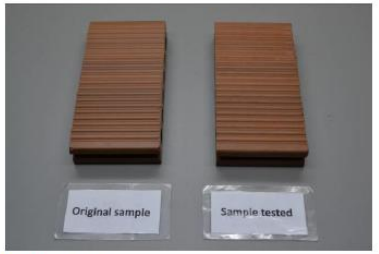
Model: US02.
After 1000 h test, Gray Scale=4-5, ΔE*=1.33.

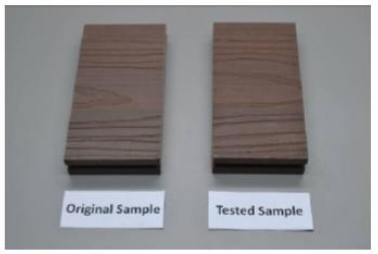
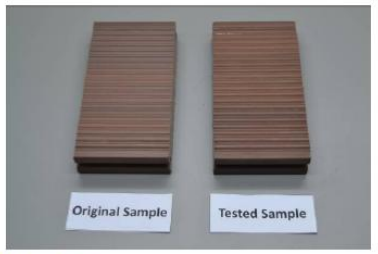
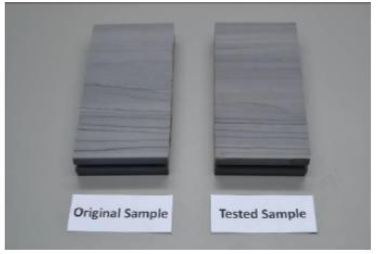
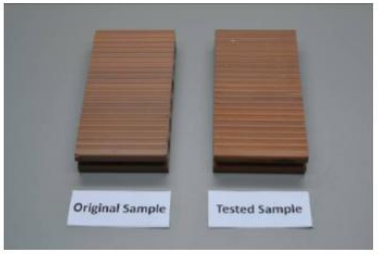
Model: UH02.
After 1000 h test, Gray Scale=4-5, ΔE*=1.09.

Model: UH07.
After 1000 h test, Gray Scale=4-5, ΔE*=1.41.

UltraShield® 500 hrs: Delta E: 0.65 - 1.25

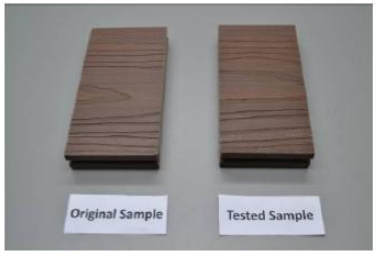
UltraShield® 1000 hrs: Delta E: 0.92 - 1.41

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

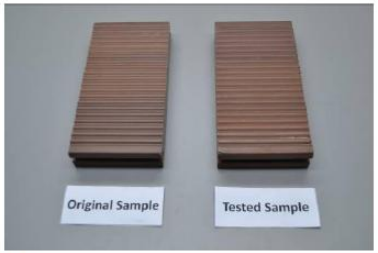
	
Model: US01. After 2000 h test, Gray Scale=3-4, ΔE*=2.55	Model: US02. After 2000 h test, Gray Scale=3, ΔE*=3.54
	
Model: UH02. After 2000 h test, Gray Scale=3, ΔE*=3.16	Model: UH07. After 2000 h test, Gray Scale=3, ΔE*=3.21

UltraShield® 1500 hrs: Delta E: 1.45 - 1.63

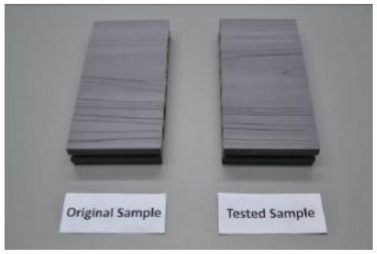
UltraShield® 2000 hrs: Delta E: 2.55 – 3.54



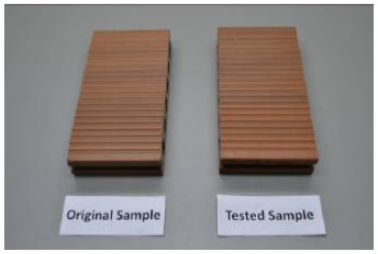
Model: US01.
After 2500 h test, Gray Scale=3-4, ΔE*=2.72



Model: US02.
After 2500 h test, Gray Scale=3, ΔE*=3.63

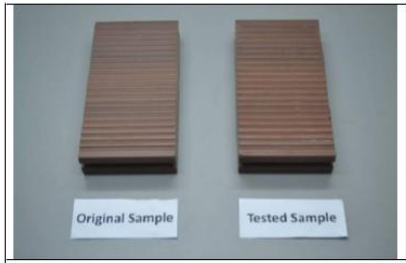


Model: UH02.
After 2500 h test, Gray Scale=3, ΔE*=3.31

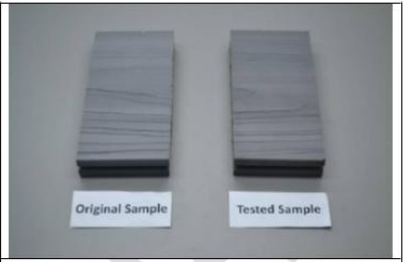


Model: UH07.
After 2500 h test, Gray Scale=3, ΔE*=3.47

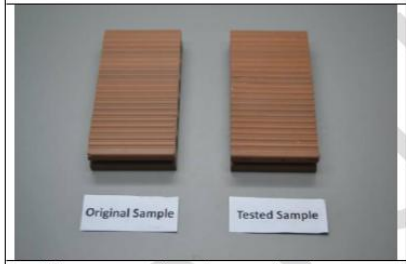
UltraShield® 2500 hrs: Delta E: 2.72 - 3.63



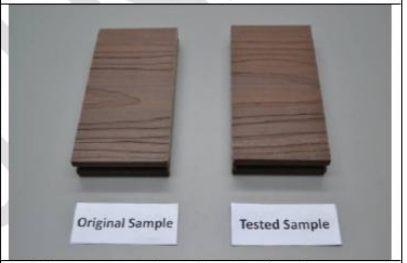
Model: US02, Part showed some color change.
There was no other visible surface damage.
After 3000 hours test, ΔE*=3.75 Gray Scale 3.



Model: UH02, Part showed some color change.
There was no other visible surface damage.
After 3000 hours test, ΔE*=3.56 Gray Scale 3.



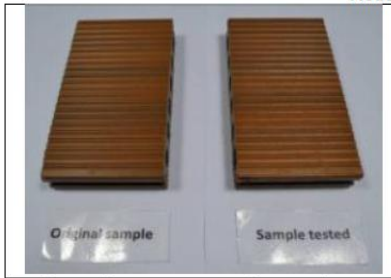
Model: UH07, Part showed some color change.
There was no other visible surface damage.
After 3000 hours test, ΔE*=3.64 Gray Scale 3.



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.

UltraShield® 3000 hrs: Delta E: 2.72 – 3.75

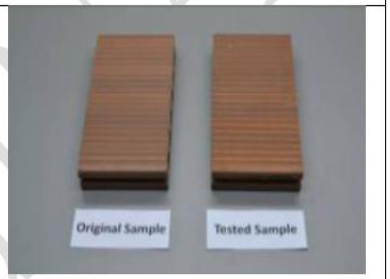
Model: UH07



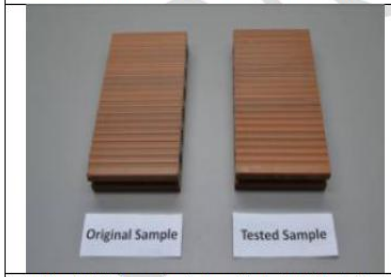
After 500 hours test, Grey Scale 4-5, ΔE*=1.23

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 colour change can be observed (Delta E <4.0)

3.5 Boiling Test

1. Put the test samples in the container (the water level needs to be over the samples by at least 5mm or more

2. Turn on the heating plate to 100℃ and observe every 2 hours

3. Samples need to be taken out every day and the duration should be recorded. The duration is recorded after the temperature of the hot plate reaches 100℃

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

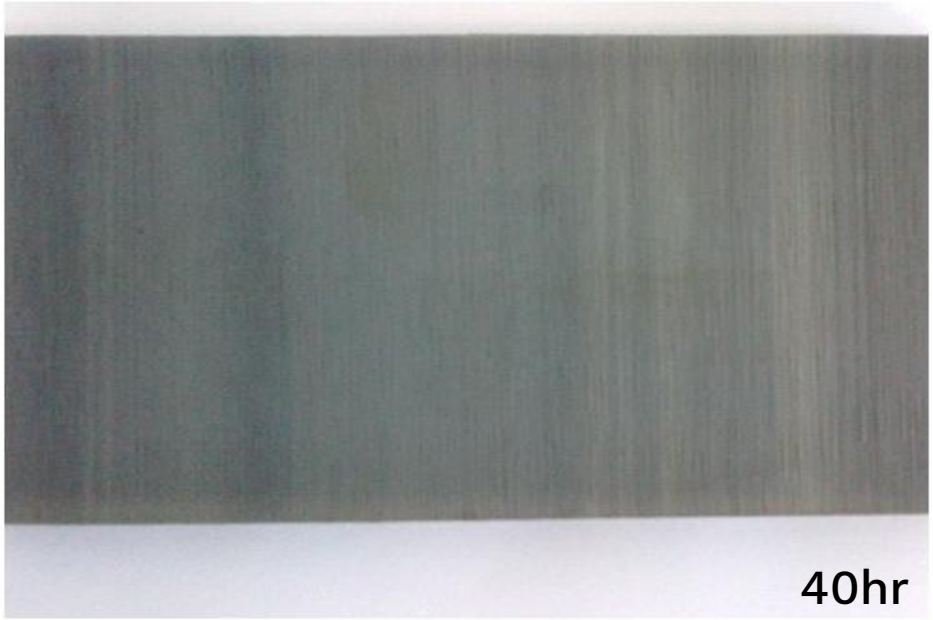
- Boil the board up to 80 hours or more.


Original


10hr


20hr

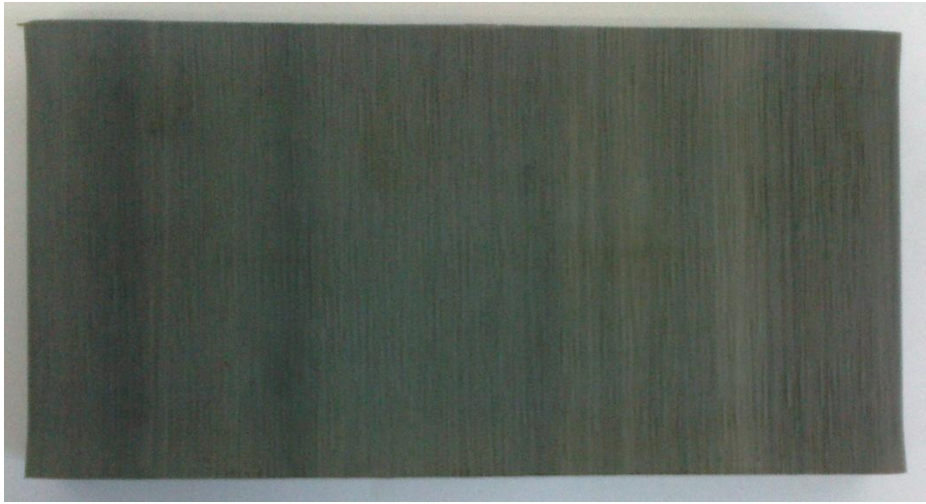

30hr


40hr


50hr


60hr


70hr



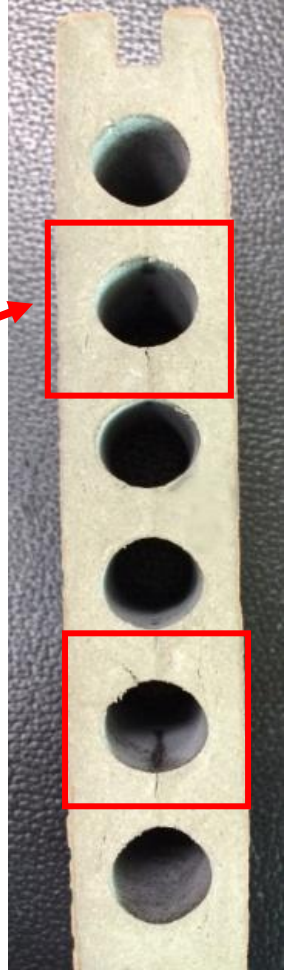
80hr 90hr

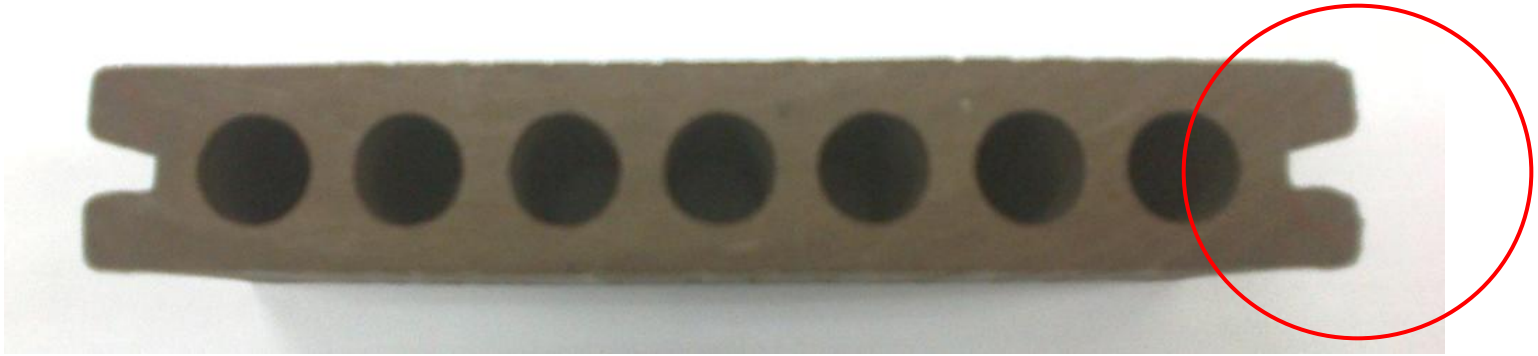
Pictures above show UltraShield® after a 90 hrs boiling test. The results show no separation between the cap layer and the core, no damage and no cracking.

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

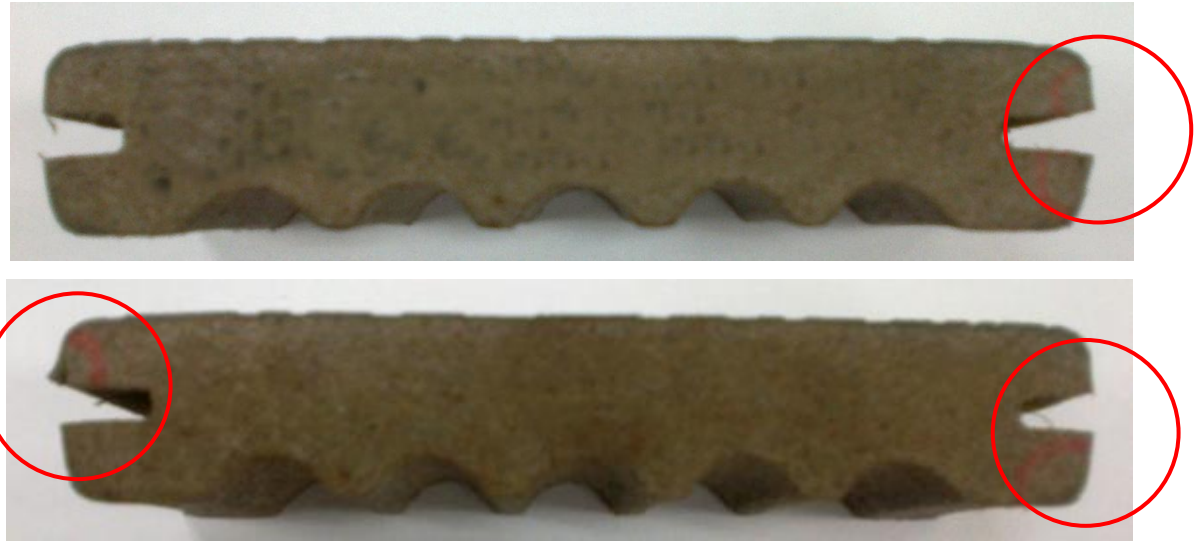
The shield shown 2 cracks, 30mm

The core shown 2 cracks, 3-5mm

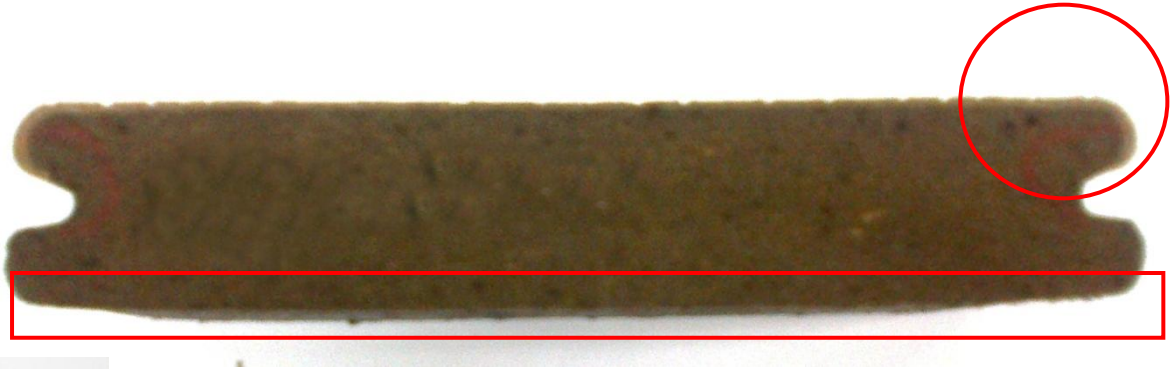




Some other Brand of fully capped composite wood shown separation after 41 hrs boiling test: Picture shown separation, 2-3mm



Some other Brands of 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 other Brands of 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.

3.6 Ash Content Test

1. Measure the weight of the material.

2. Put the material into the Muffle furnace for 6hours at 600℃±25℃

3. Measure the ash content and the weight of the material after it cools down.

Test Standard：
GB/T 9345.1—2008/ISO 3451-1:1997

- Percentage of the ash content is calculated by the formula

$$\frac{m_1}{m_0} \times 100$$

m0----Sample weight（g）
m1---Ash weight（g）

No.	Conventional Ash Content （%）	UltraShield Ash Content （%）
1	10.10	3.19
2	10.58	3.43
3	10.84	3.26
4	10.03	3.44
5	10.20	3.45
6	10.77	3.18
Average	10.42	3.33

The main substance in ash content is fillers (inorganic substances). The higher the ash content means that there are more fillers which makes the product easier to crack.

4. The colour and surface treatment

Besides the durability, the range of available colours is a very important element for the growth of capped composite.

NewTechWood UltraShield currently has 22 colours and will continue to develop more colours.

UltraShield® Naturale™ Colours

NewTechWood®

UltraShield® Naturale™ Patterns

Ultra Protection

Superb colours and patterns

UltraShield® Naturale™

NewTechWood®

For more information, please visit
www.newtechwood.com.au