



KIEN NHAT CONSTRUCTION DESIGN JOINT STOCK COMPANY – KNC

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ENVIRONMENT-CONSCIOUS

LANDSCAPE DESIGN

MATERIAL



Kankyo-wood II

Kankyo-wood II is an wood plastic composite (WPC) product molded from a blended material of recycled plastics and pulverized waste wood. It is a next generation construction material, a new recycled products that would not need any new natural resource consumption.

It is a long lasting, but natural wood like, textured products.
It would not have fine split or spine on the surface.
It is an easy maintenance care-free material.
Dirt and scratches on surface may get removed by cloth or sand papers.

Corrosion Free
Kankyo-wood II is a mixtured material with plastic and wood, therefore is very hard to get wrotten, extremely strong against termite and insect attacks.

Anti-slippness Function
Kankyo-wood II surface is roughened by sand paper and is considered to be safe walking on it.

Anti-statics Function
All Decks products have anti-statics treated type option.
They are free from electricity attacks caused by plastic material content.



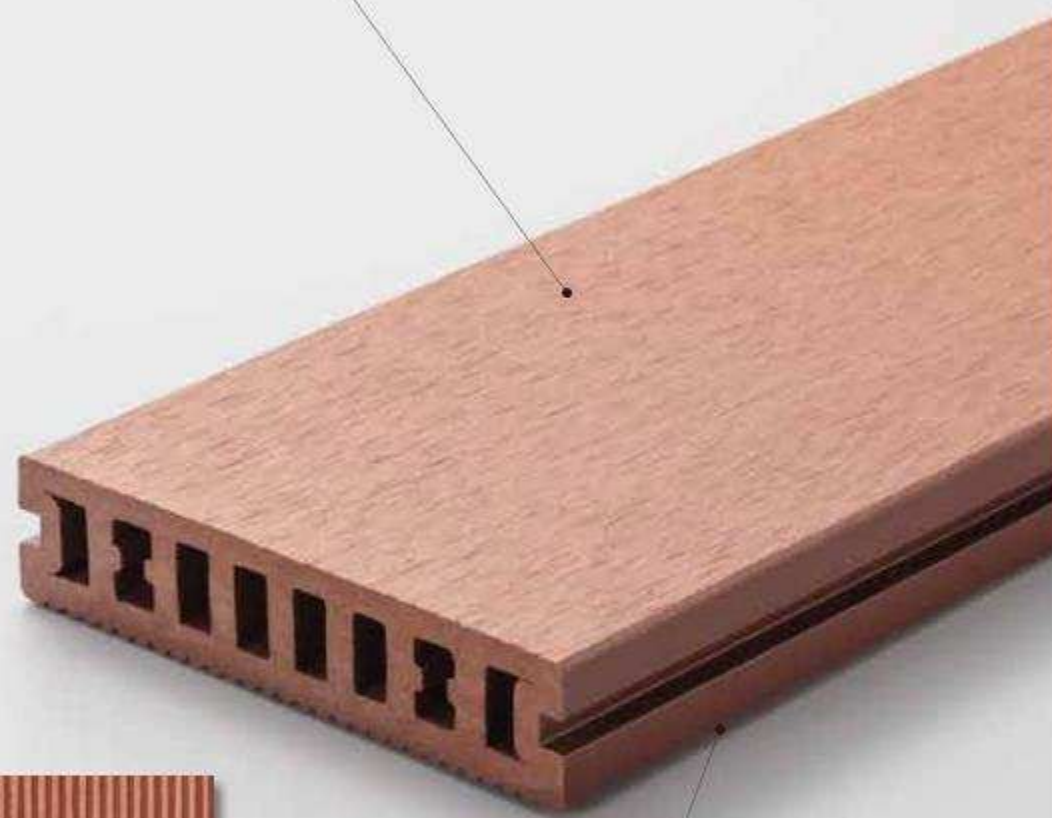
c o n t e n t s

	Pages	
Products	02	Products line up
	06-19	Job references Decks Louvers Fences
	20	Ecology Material
Parts	24-29	Parts line up 1.Decks 2.Louver 3.Fence
Installation designs	30-33	Decks 1.Joist (single) 2.Joist (double) 3.Low decking 4.High decking
	34-36	Modesty panel 1.Joist (single) 2.Joist (double) 3.Low decking
	37	Inspection window
	38-39	Louvers 1. Vertical louver 2. Horizontal louver
Quality Performance	40	1.Quality
	41	2.Corrosion
	42	3.Anti-slipperiness
	43	4.Anti-static
Installation Cautions	44	Kankyo-woodII feature Cautions
	45	Maintenance Method

MKV02

Decks: 145mm x 30mm

Flat surface



Slit surface



Color line ups



Dark Brown
(DB)



Brown
(BR)



Light Brown
(LB)



Grey
(GR)
* by order



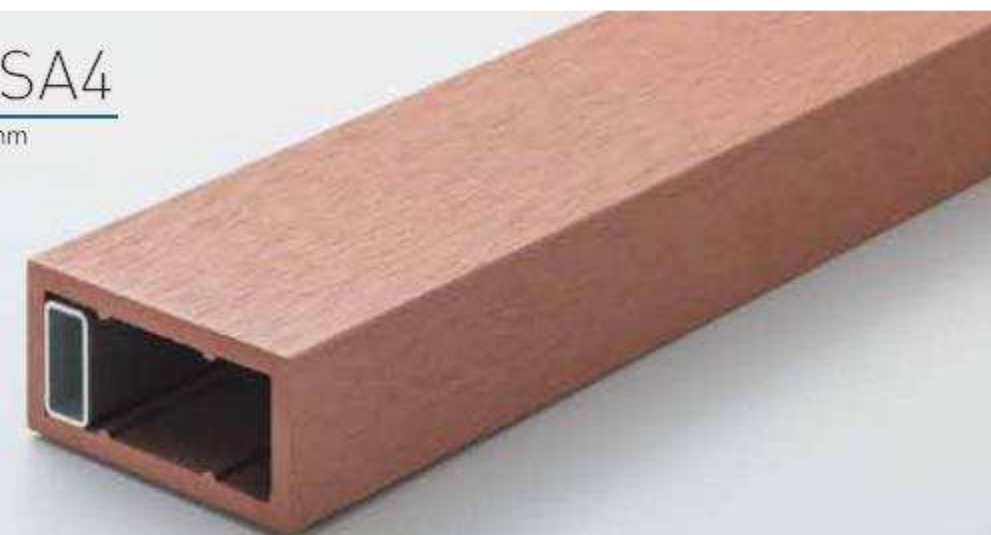
MKV05

Decks: 200mm x 26mm



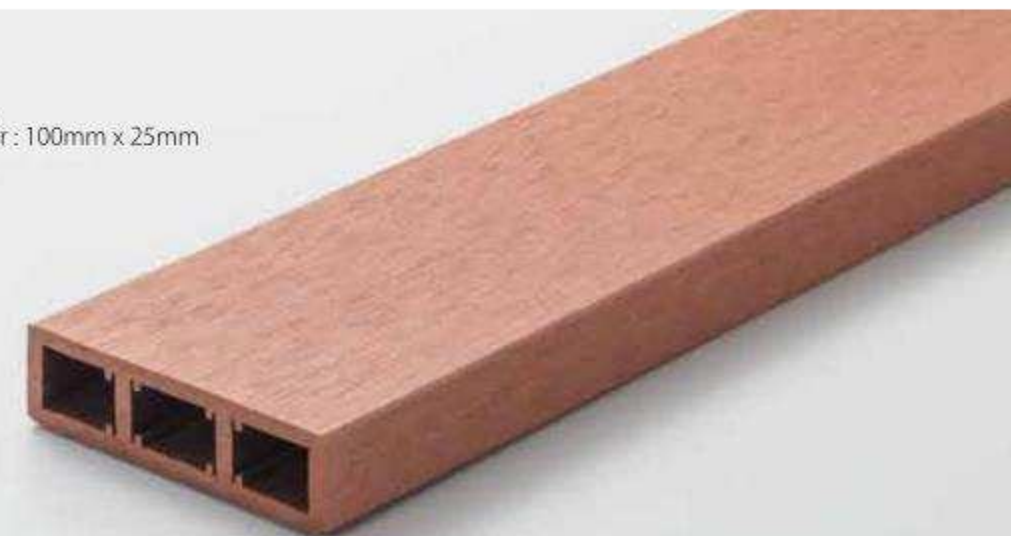
MKV10-SA4

Louvers: 90mm x 45mm



MKV12

Stair / Fence / Louver: 100mm x 25mm







MKV02 BR color

Deck

Kankyo-wood II has an wood like smooth and warm texture.

Clips system would not let screw show up on the surface and keep the flat surface.

It allows the secondary fabrication. However, even after secondary fabrication, it is long lasting than wood.



MKV02 DB color



MKV02 DB color



MKV02 BR color



MKV02
LB/BR/DB color



MKV02/MKV03
LB/BR color



MKV02/MKV03 LB color



MKV02/MKV03
BR/DB color



MKV04/MKV09
BR/DB Color



MKV04
DB Color



MKV04
DB Color



MKV02
LB Color



MKV04
BR Color



MKV05
DB Color

MKV05
BR Color



MKV05
BR Color



MKV05
GR Color



MKV02/MKV05
BR Color



MKV02
LB Color





Louver

Kankyo-wood II louver creates privacy, without shading too much sun light.

Technology enabled various louver design, profiles, various width and height.



MKV09/MKV10
BR Color.





MKV09
BR Color



MKV09
BR Color



MKV12
DB Color

MKV10
LB Color



MKV09
DB Color



MKV10
GR Color



MKV10
BR Color

Fence

Kankyo-wood II fence actualizes an warm wood appearance, long-life support with aluminum reinforcement inside. It creates a fresh visual harmony in urban scenes.



MKV09
LB Color



MKV05/MKV10
LB Color



MKV10
LB Color



MKV10/MKV11
DB Color



MKV11
BR Color





Creating an exterior design for sustainable society

We MAEDAKOSEN CO.,LTD., provide the Kankyo-wood II by re-using the recycled plastic and waste wood. It does not require any new wood resource consumption. An wood like appearance gives an warm harmony with sceneries, and moreover, it even has corrosion free durability. It is easy to work secondary process too. Kankyo-wood II creates an exterior design for sustainable society.



Kankyo-wood II has an Eco mark certificate, approved by Japan environment association. It is approved as a recycling contributinal product to the society. Eco Mark Certification No. 07-131-002

Absolute quality control system

Kankyo-wood II is produced through strict quality control, ensuring stable usability at client installation site. The quality is double checked through strict test to eradicate quality claims.



Raw Material

Raw Material

Kankyo-wood II is using recycled plastic of PE/PP and waste wood. Waste wood is processed and pulverized into micron level powder and then extruded through extruder together with recycled plastic.



Raw Material Mixture



Research and Development, Self-Production

Research and Development

Kankyo-wood II has own research and development facility in Japan. Specialized R&D staff, line and lab are leading its creation and development. New technology innovation is being continuously challenged to actualize further expansion of WPC boundary.

Production

Kankyo-wood II is produced at own Kankyo-wood factory only, with firm quality assurance.



Quality Assurance

Kankyo-wood II is produced and controlled within strict quality criteria. Products that only clear strict inspection will be shipped to clients site.

※ Although, color may vary some level due to the recycled material.

Design

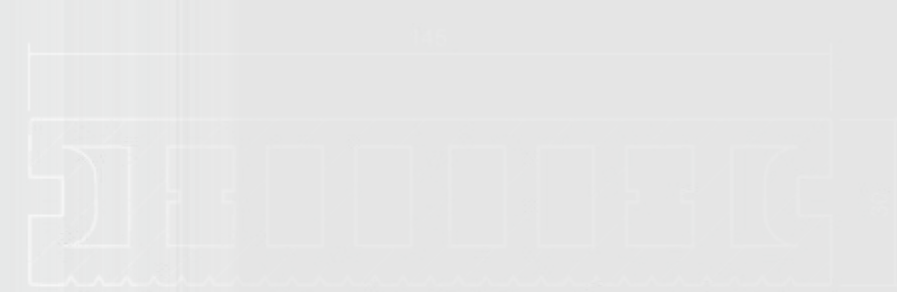
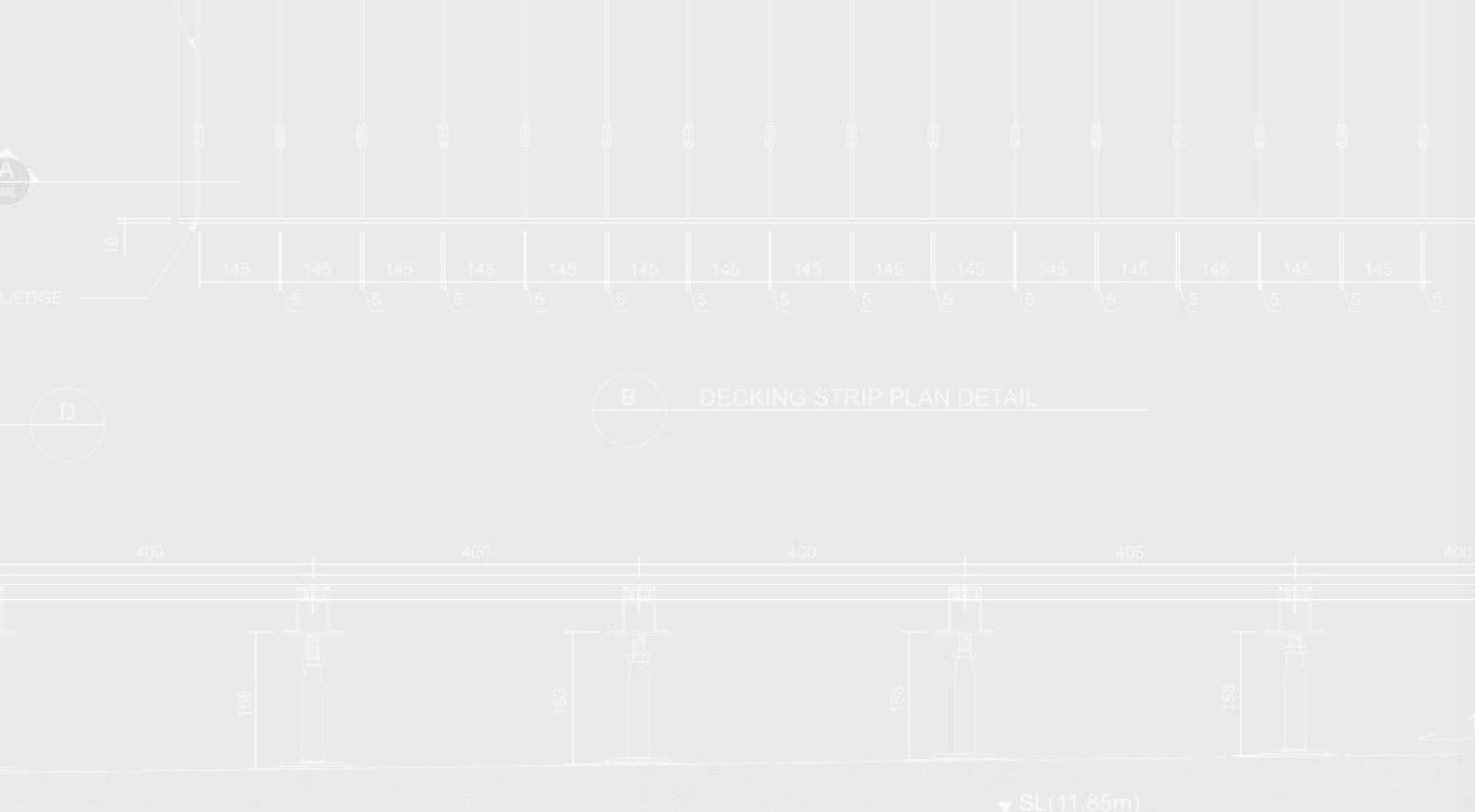
Design

Various design customization is available along clients needs.



Competitive Cost

Kankyo-wood II is designed, produced and distributed by MAEDAKOSEN.CO.,LTD. Controlled by single company own supply chain, flexible and smooth delivery is available. At the same time, saving the supply chain cost, further cost down is realized.



Technical Information

Parts

- 24-29 **Parts line up**
- 1.Decks
 - 2.Louver
 - 3.Fence

Installation designs

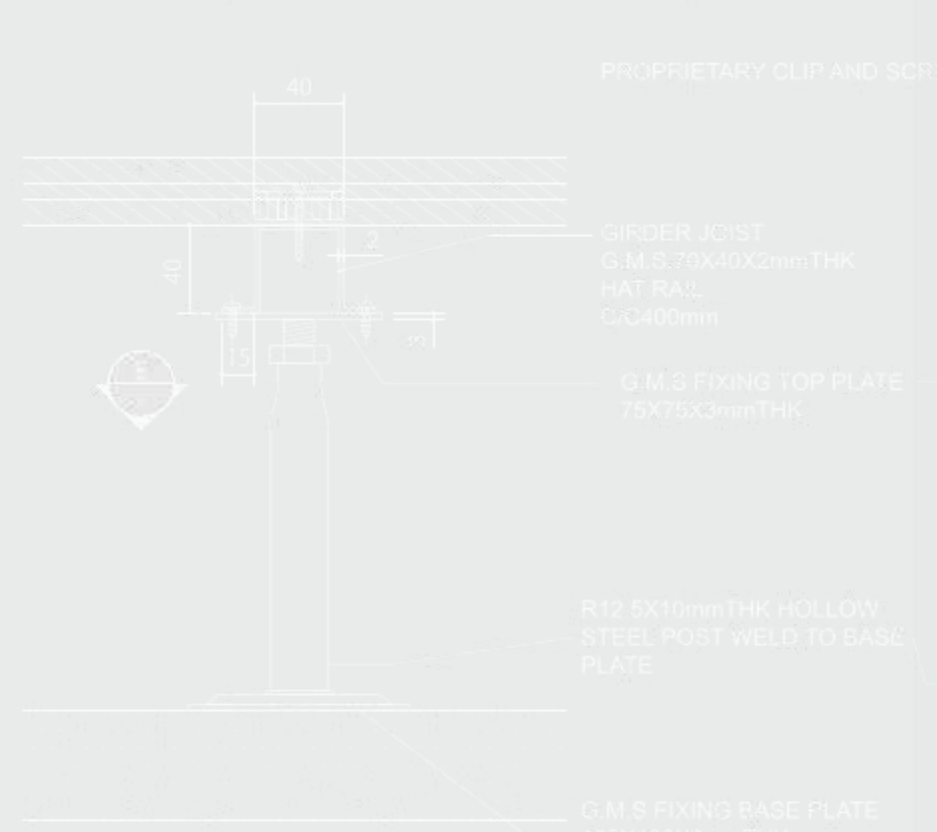
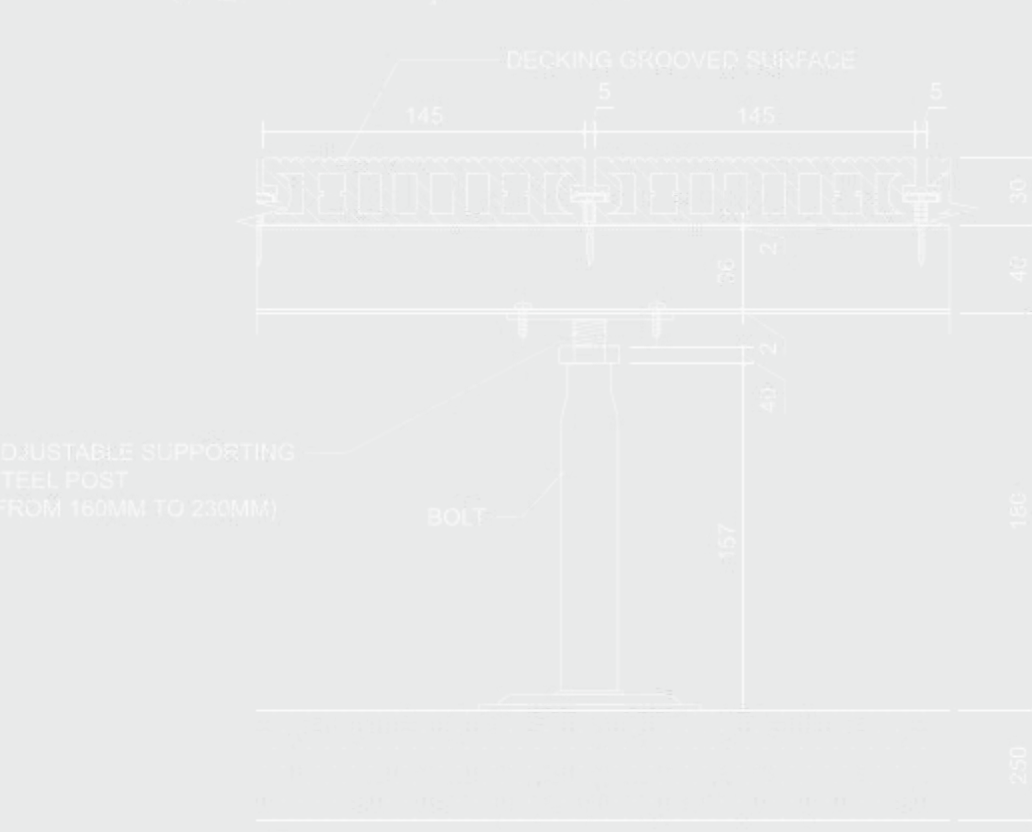
- 30-33 **Decks**
- 1.Joist (single)
 - 2.Joist (double)
 - 3.Low decking
 - 4.High decking
- 34-36 **Modesty panel**
- 1.Joist (single)
 - 2.Joist (double)
 - 3.Low decking
- 37 **Inspection window**
- 38-39 **Louvers**
1. Vertical louver
 2. Horizontal louver

Quality Performance

- 40 1.Quality
- 41 2.Corrosion
- 42 3.Anti-slipiness
- 43 4.Anti-static

Installation Cautions

- 44 Kankyo-woodIII feature Cautions
- 45 Maintenance Method



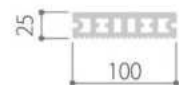


Kankyo-wood II has a wood like smooth and warm texture.
Deck clips system would not show up the screw on the surface of decks and keep the smooth surface.
It allows the secondary process work but still long lasting than wood.

Deck Material

MKV01-100×255

Ref.Weight : 2.2kg/m
Size : 2,000mm
※ To be produced by order



MKV02-145×305

Ref.Weight : 3.8kg/m
Size : 2,000mm



MKV03-150×13M

Ref.Weight : 2.4kg/m
Size : 2,000mm



MKV04-145×255

Ref.Weight : 3.1kg/m
Size : 2,000mm



MKV05-200×26M

Ref.Weight : 6.5kg/m
Size : 2,000mm



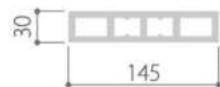
MKV07-145×30M

Ref.Weight : 5.5kg/m
Size : 2,000mm
※ To be produced by order



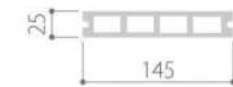
MKV13-145×30SL

Ref.Weight : 3.1kg/m
Size : 2,000mm



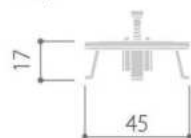
MKV23-145×255

Ref.Weight : 3.1kg/m
Size : 2,000mm

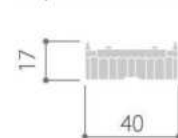


Clips

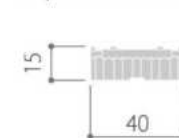
Clip for 30mm height



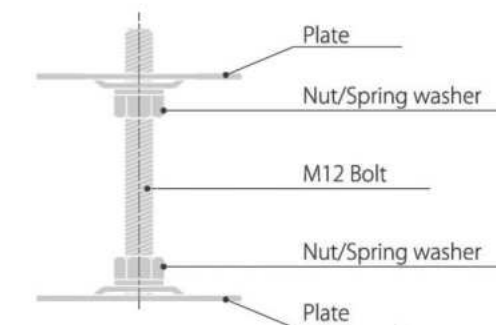
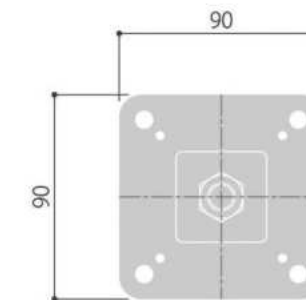
Clip for 30mm height



Clip for 25mm height

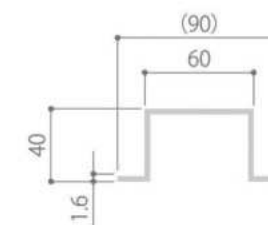


Steel Plate for Post

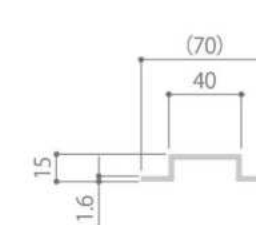


Joist and Girder

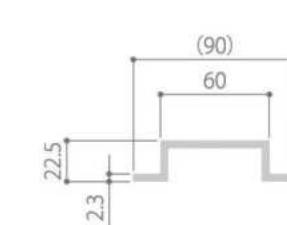
Hat Metal 1 Galvanized steel



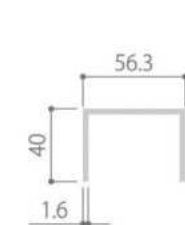
Hat Metal 2 Galvanized steel



Hat Metal 3 Galvanized steel



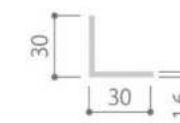
C Shape steel Galvanized steel



Other material

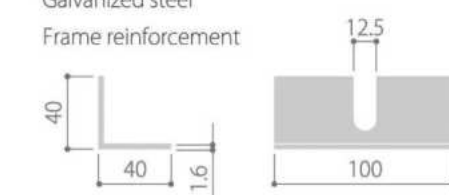
L angle

Galvanized steel
Frame reinforcement



L screw

Galvanized steel
Frame reinforcement



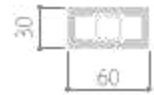


Kankyo-wood II louver would add the building surface warm, comfortable and natural appearance, controls sunshine, wind and sight.

Louver Material

MKV09-60×30SA3

Ref.Weight : 1.5kg/m
Size : 2,000mm
20×20×2.0t Aluminum
※ To be produced by order



MKV09-60×30SA4

Ref.Weight : 1.4kg/m
Size : 2,000mm
30×15×1.5t Aluminum
※ To be produced by order



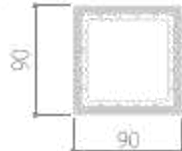
MKV10-90×45SA4

Ref.Weight : 2.2kg/m
Size : 2,000mm
30×15×1.5t Aluminum
※ To be produced by order



MKV11-90×90SA2

Ref.Weight : 4.4kg/m
Size : 2,000mm
70×70×2.0t Aluminum
※ To be produced by order



MKV10-90×45SA1

Ref.Weight : 2.5kg/m
Size : 2,000mm
30×30×2.0t Aluminum
※ To be produced by order



MKV12-100×25SL

Ref.Weight : 1.6kg/m
Size : 2,000mm
※ To be produced by order



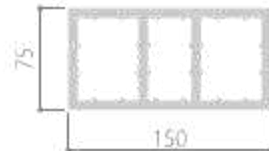
MKV17-150×50S

Ref.Weight : 3.9kg/m
Size : 2,000mm
※ To be produced by order



MKV18-150×75S

Ref.Weight : 5.1kg/m
Size : 2,000mm
※ To be produced by order

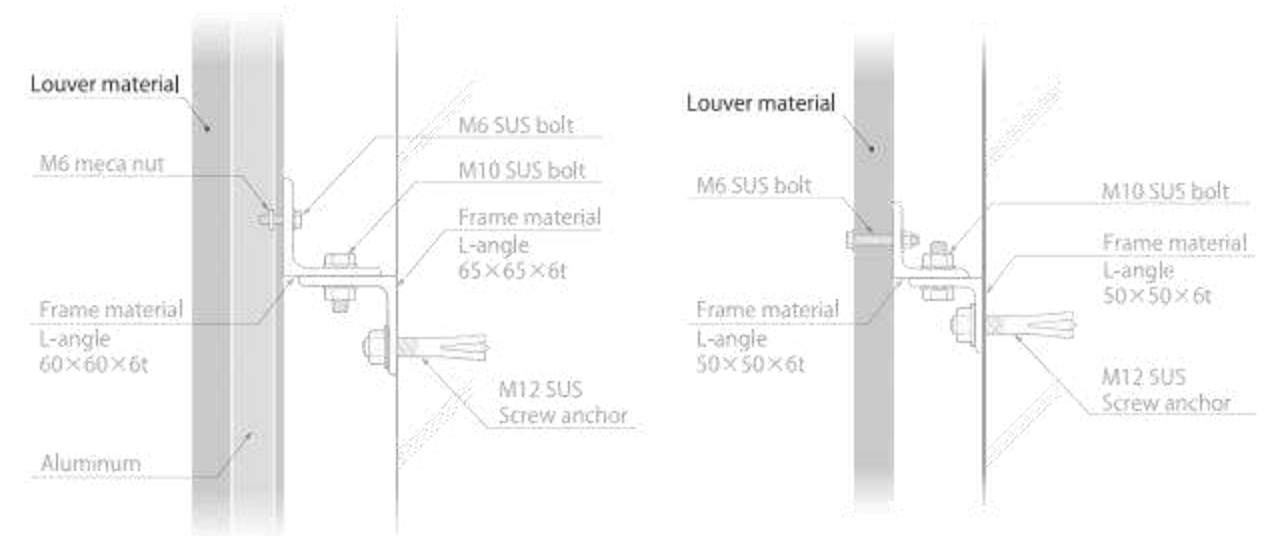


MKV20-300×50S

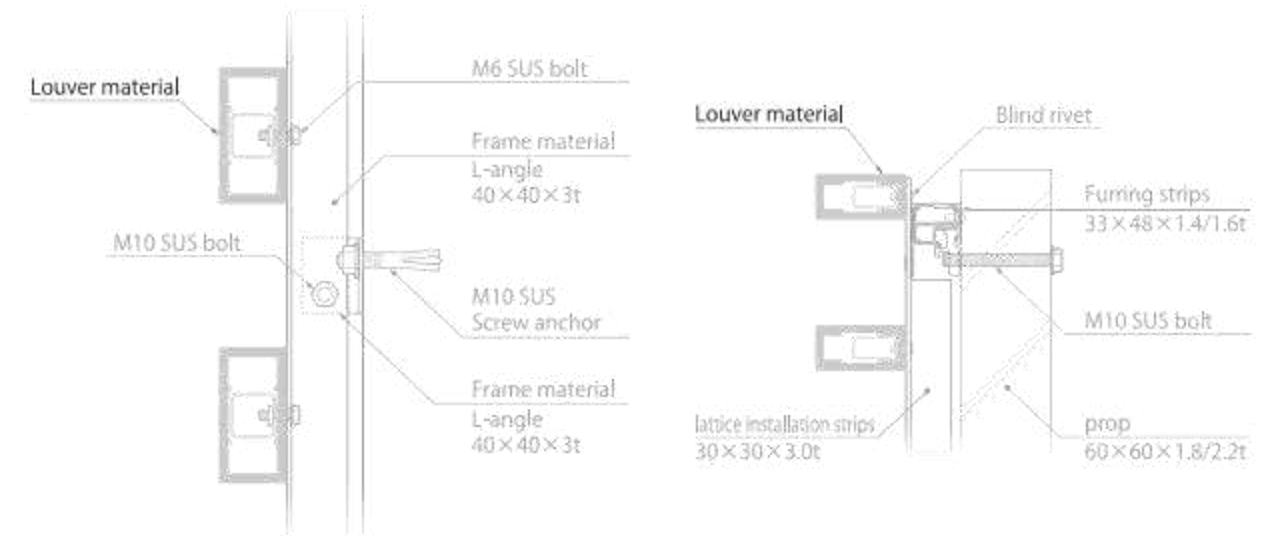
Ref.Weight : 7.1kg/m
Size : 2,000mm
※ To be produced by order



Vertical louver



Lateral louver



※ Above drawing is reference. Installation shall reflect actual site condition.



Kankyo-wood II fence provides long-life safety, harmony with natural scenery that all generation from children to old people would enjoy.

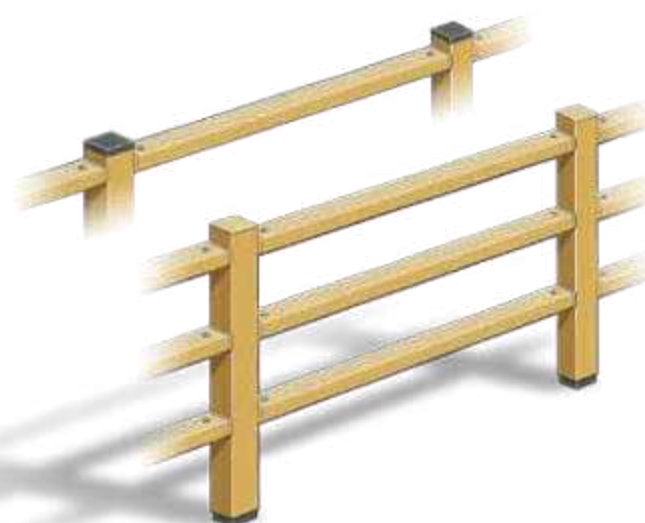
Wire Type KWFV-K1-2011

Standard size : 2,000mm × 1,100mm
Wire Type : Kankyo-wood II MKV11-90 × 90SA2
Top rail : Kankyo-wood II MKV10-90 × 45SA1
Lattice : φ6 stainless wire



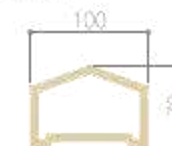
Horizontal Lattice Type KWFB-K1-2011-3

Standard size : 2,000mm × 1,150mm
Wire Type : Kankyo-wood II MKV11-90 × 90SA2
Horizontal Lattice Type : Kankyo-wood II MKV10-90 × 45SA1



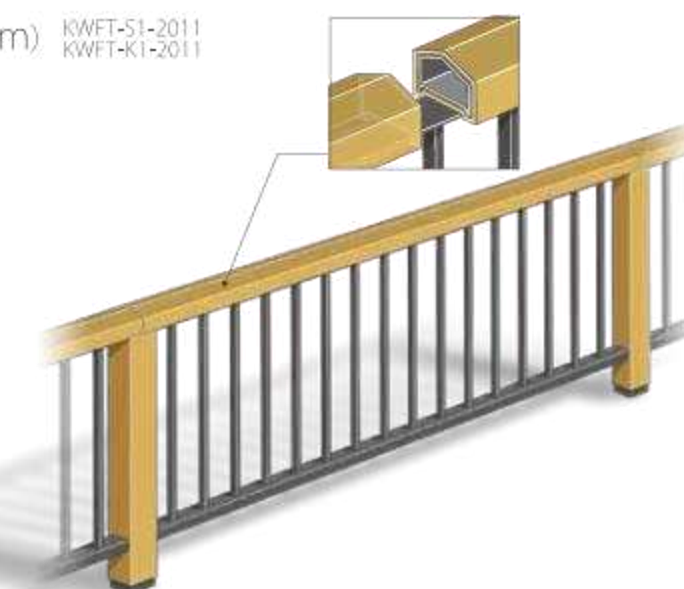
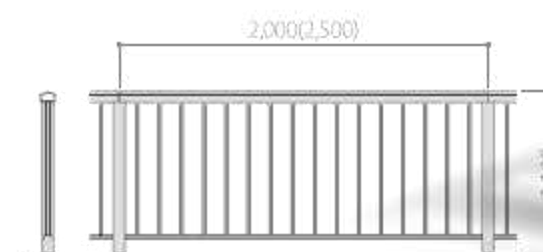
Top Rail Kankyo-wood II MKV16-100 × 70SY

Rail Top surface is inclined so that arms can rest.
It also avoids cans and bottles to be put on top and is easier to keep clean.



Vertical Lattice Type (aluminum) KWFT-S1-2011 KWFT-K1-2011

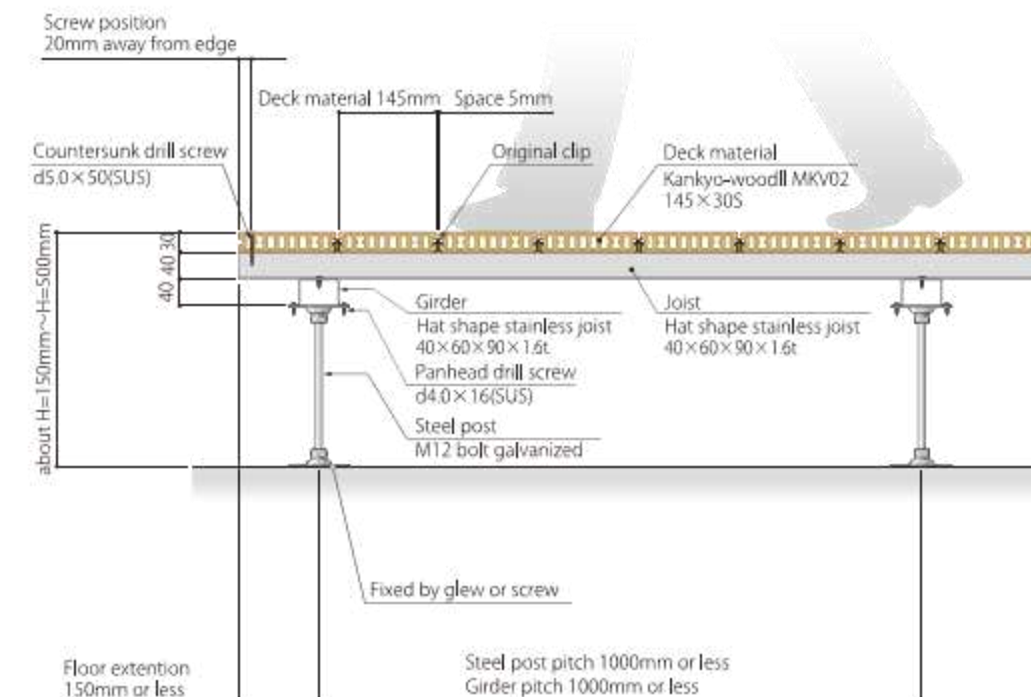
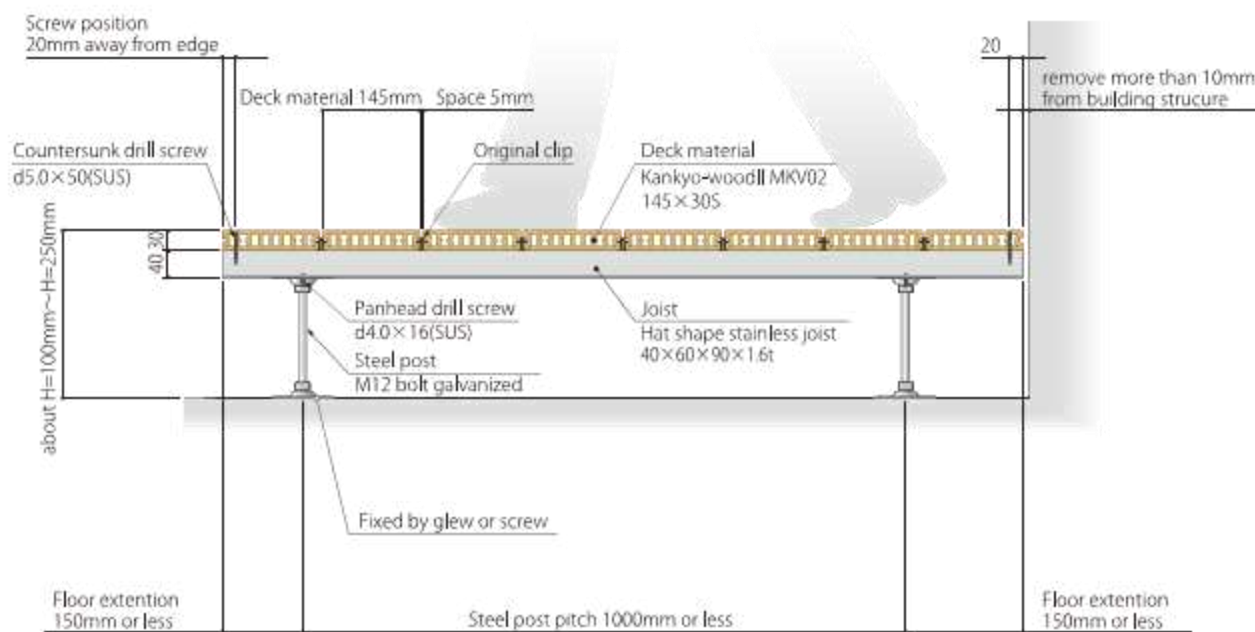
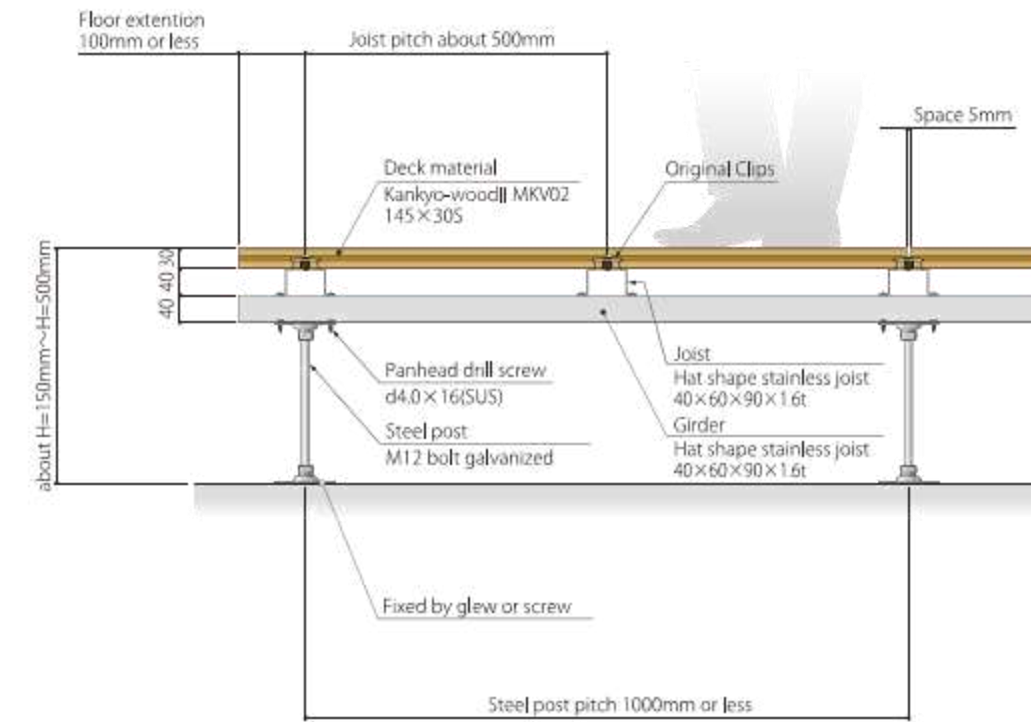
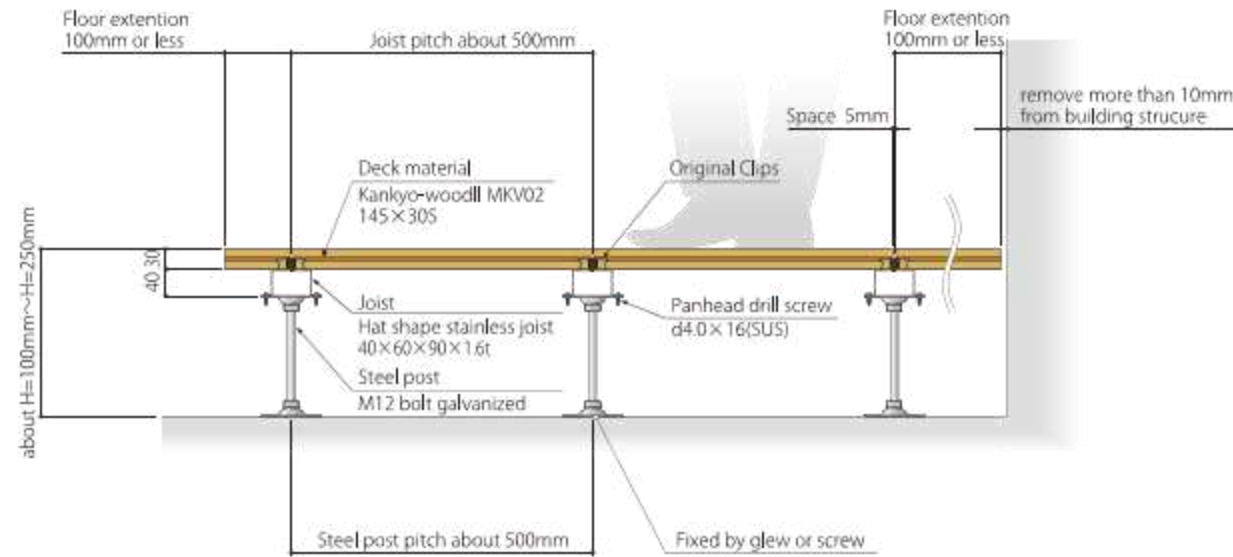
Standard size : 2,000mm × 1,100mm
Wire Type : Kankyo-wood II MKV15-80 × 80S
Top rail : Kankyo-wood II MKV16-100 × 70SY
Lattice : aluminum pole

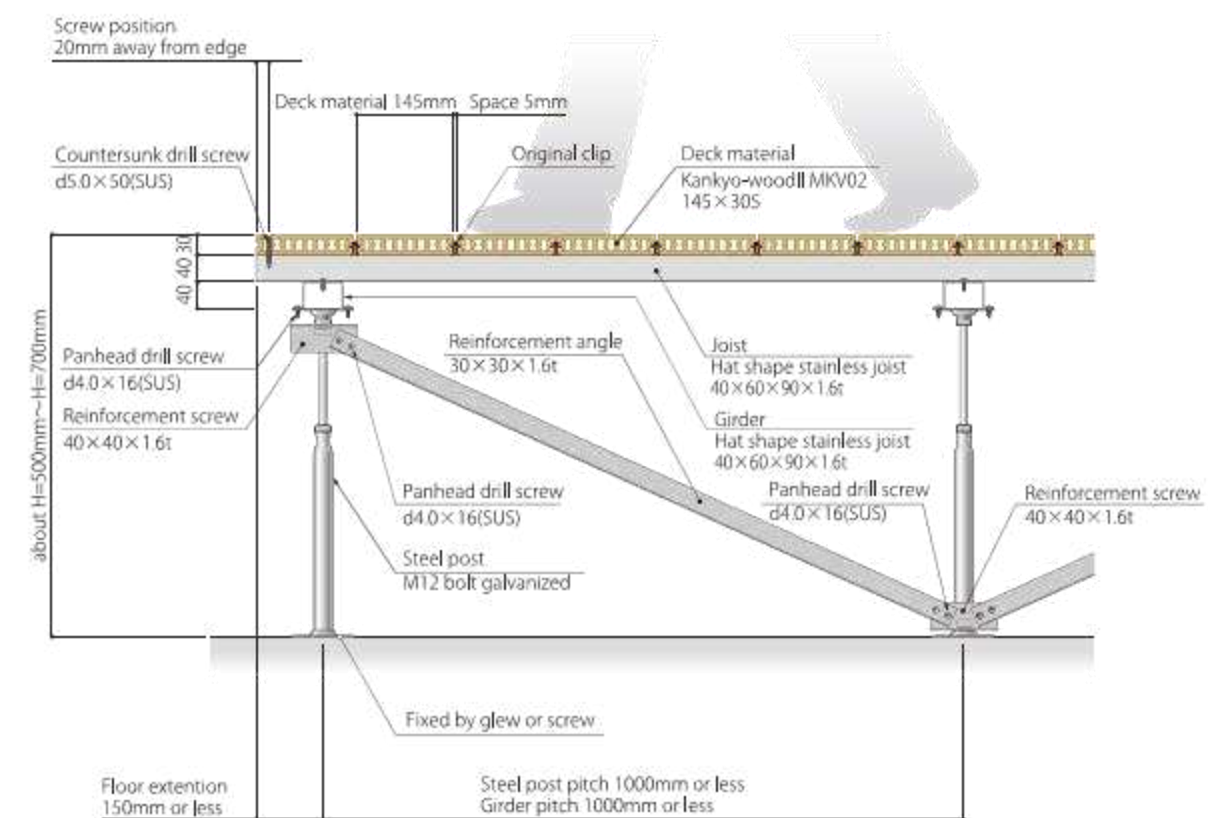
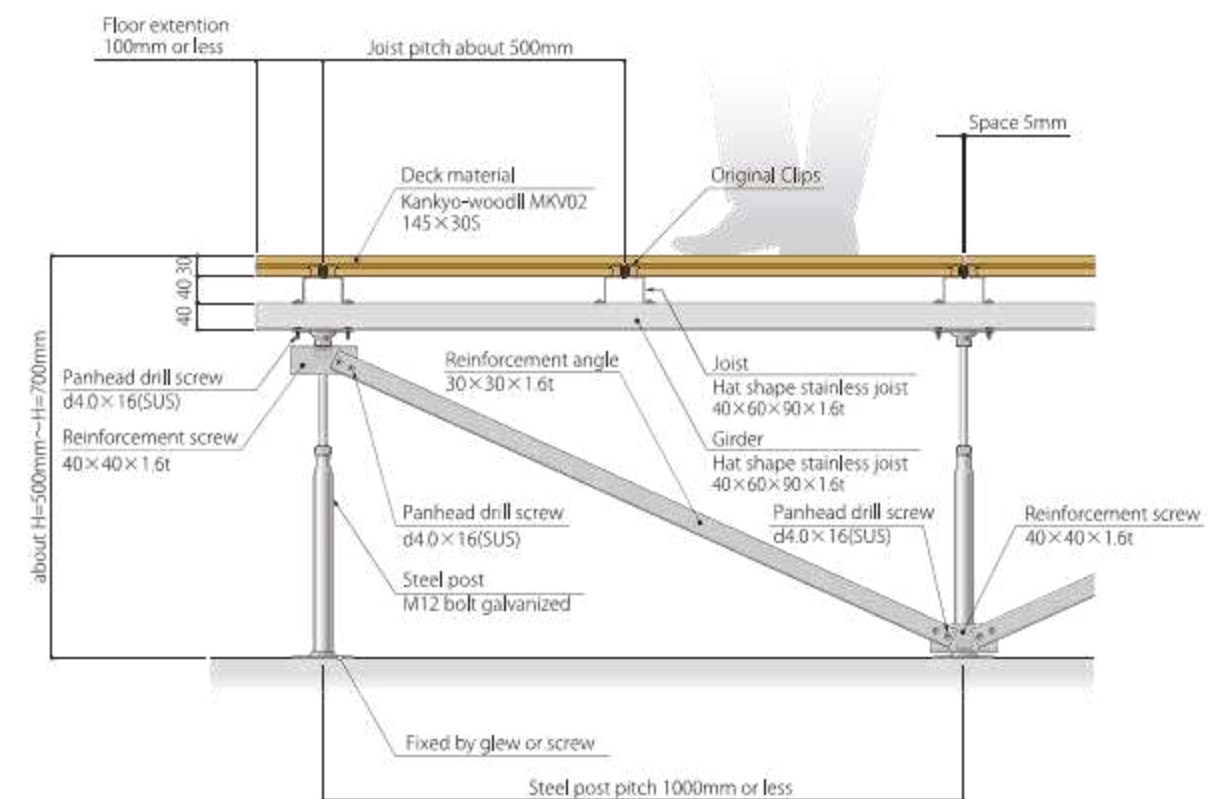
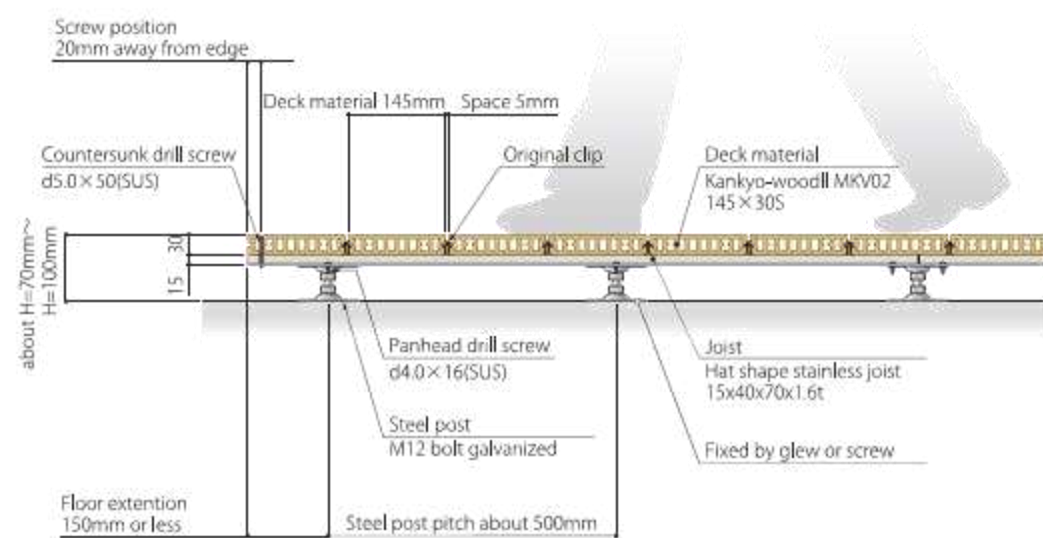
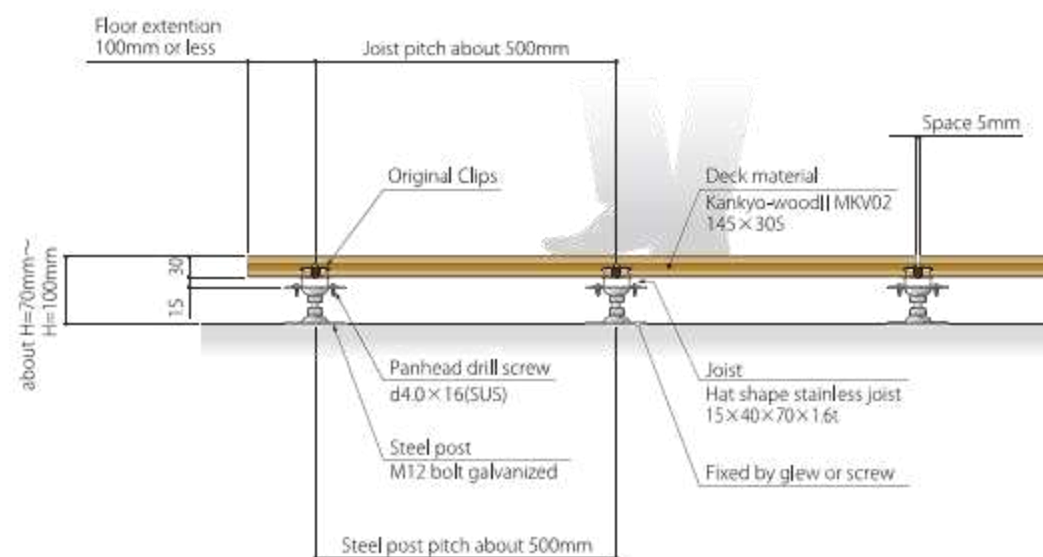


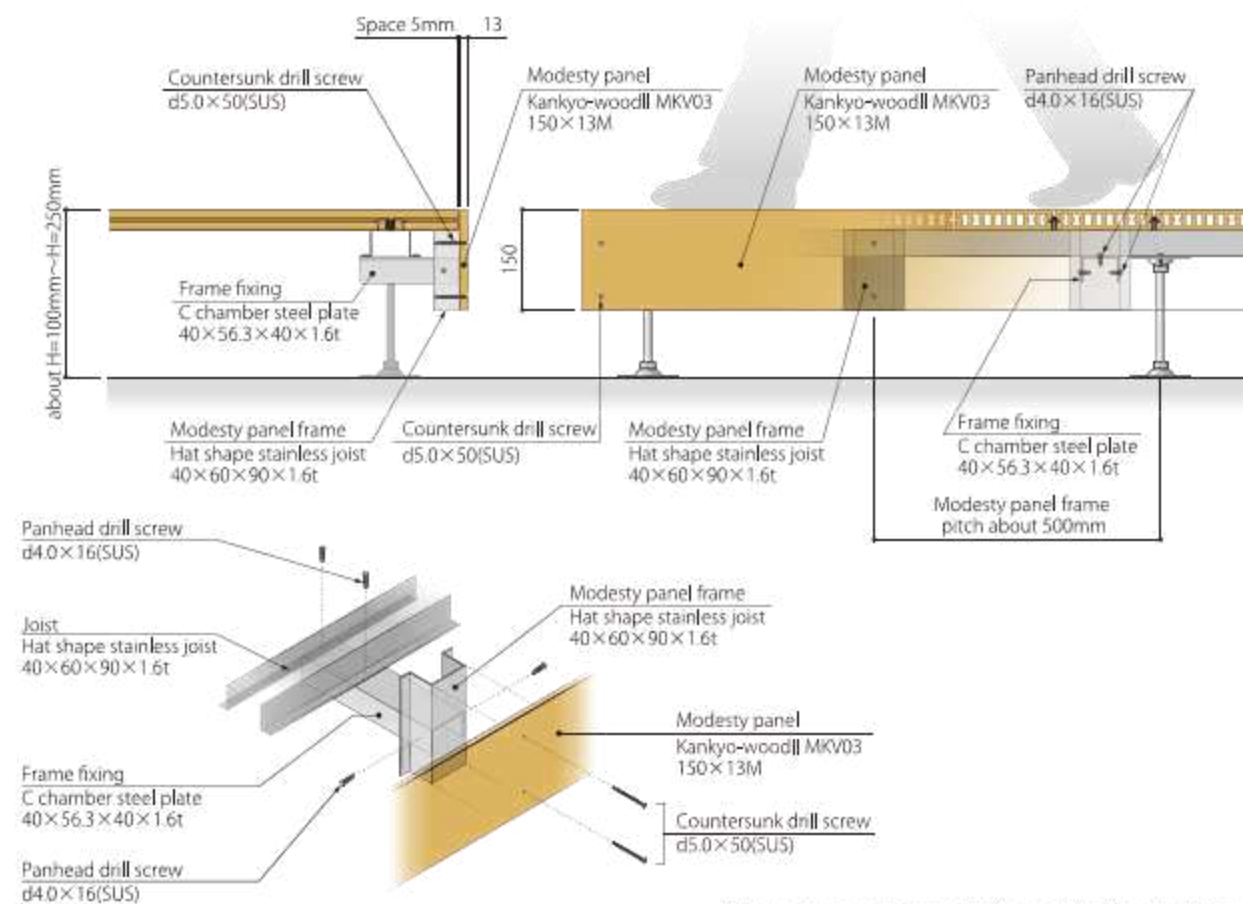
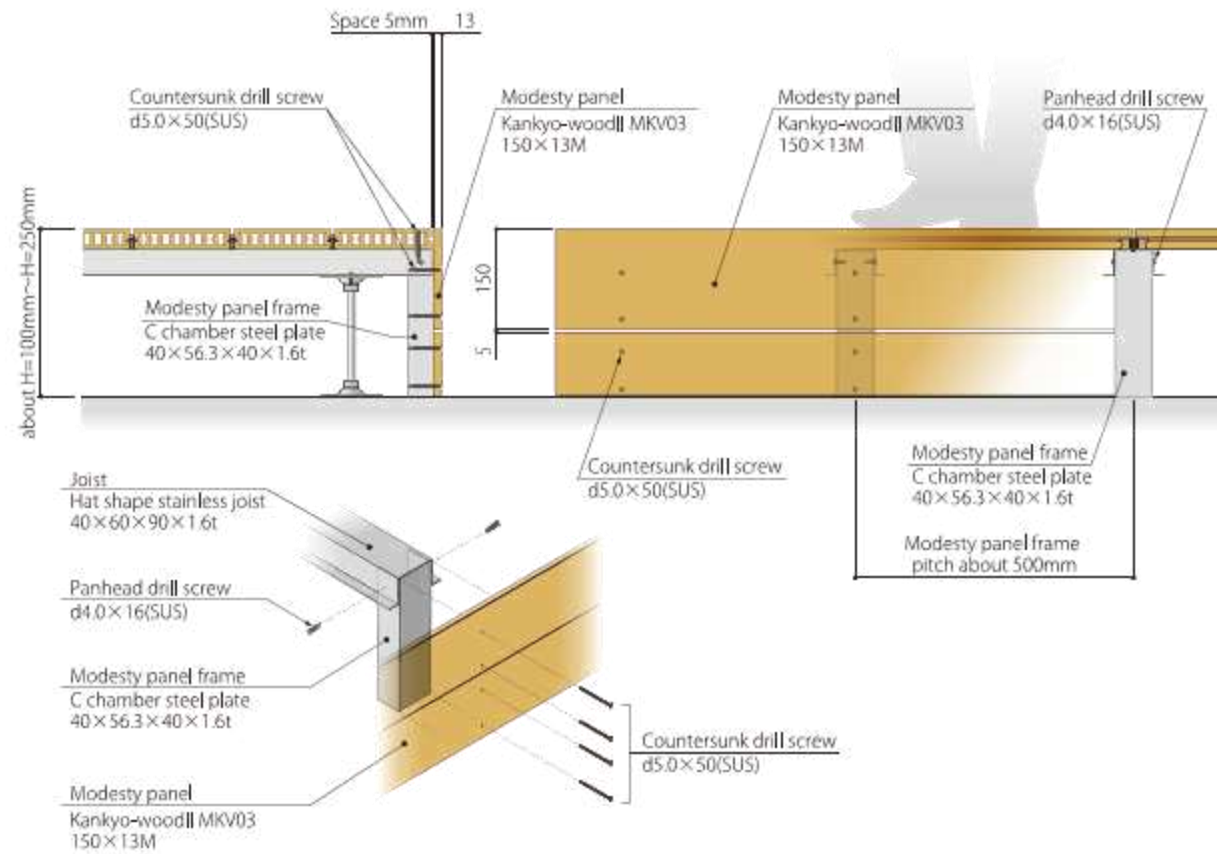
Vertical Lattice Type (Kankyo-wood II) KWFT-K2-2011

Standard size : 2,000mm × 1,120mm
Wire Type : Kankyo-wood II MKV11-90 × 90SA2
Top rail : Kankyo-wood II MKV10-90 × 45SA1
Lattice : Kankyo-wood II MKV09-60 × 30SA4

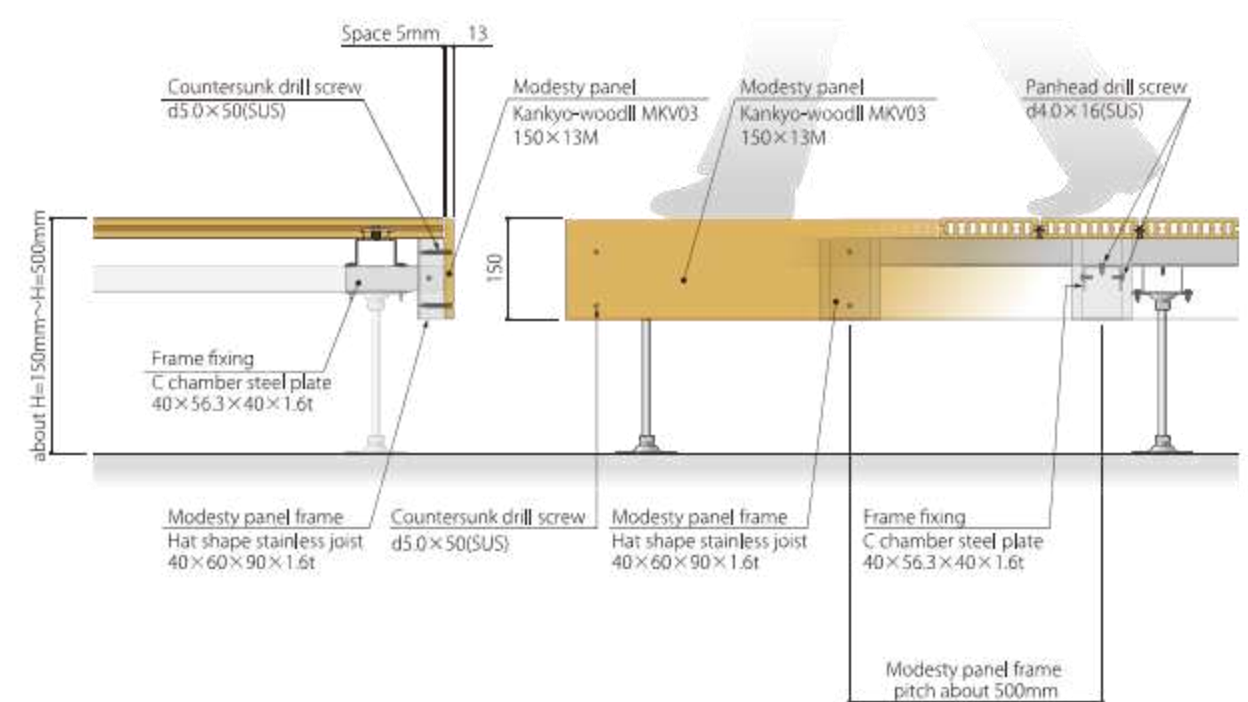
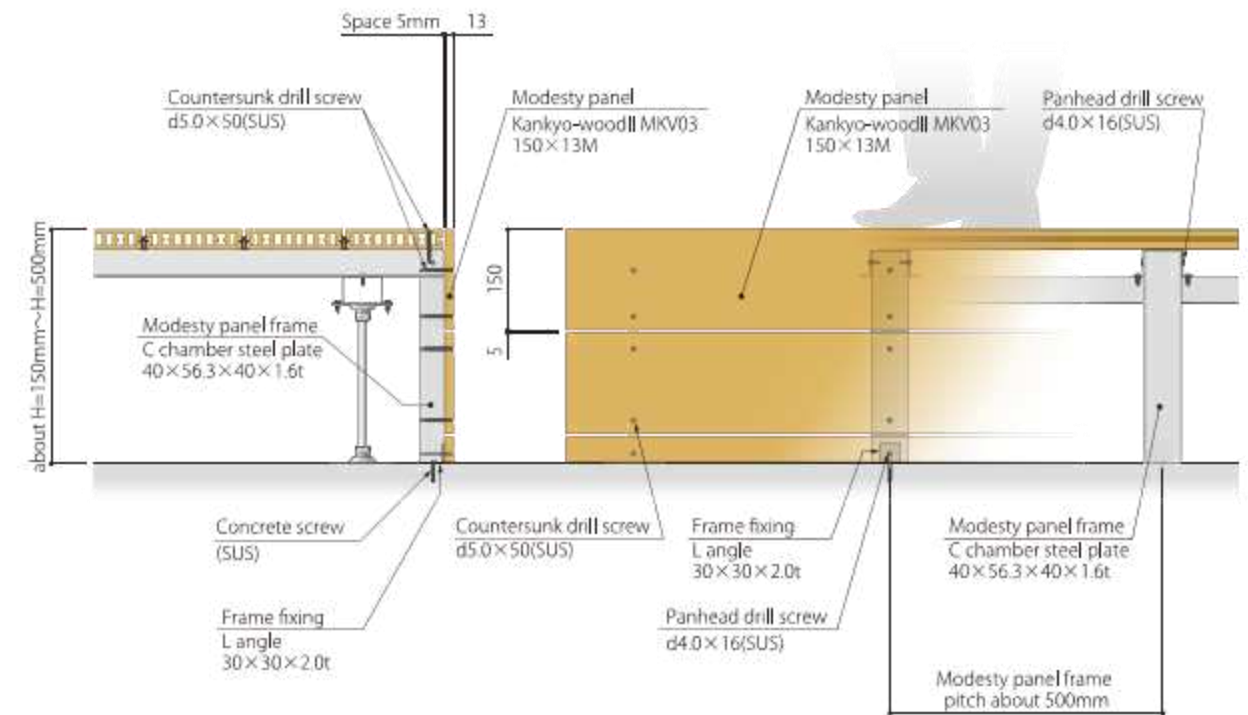




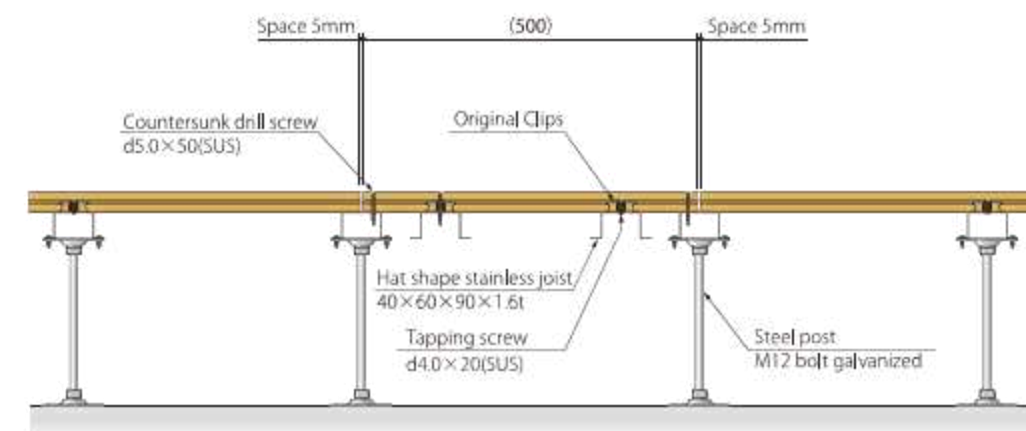
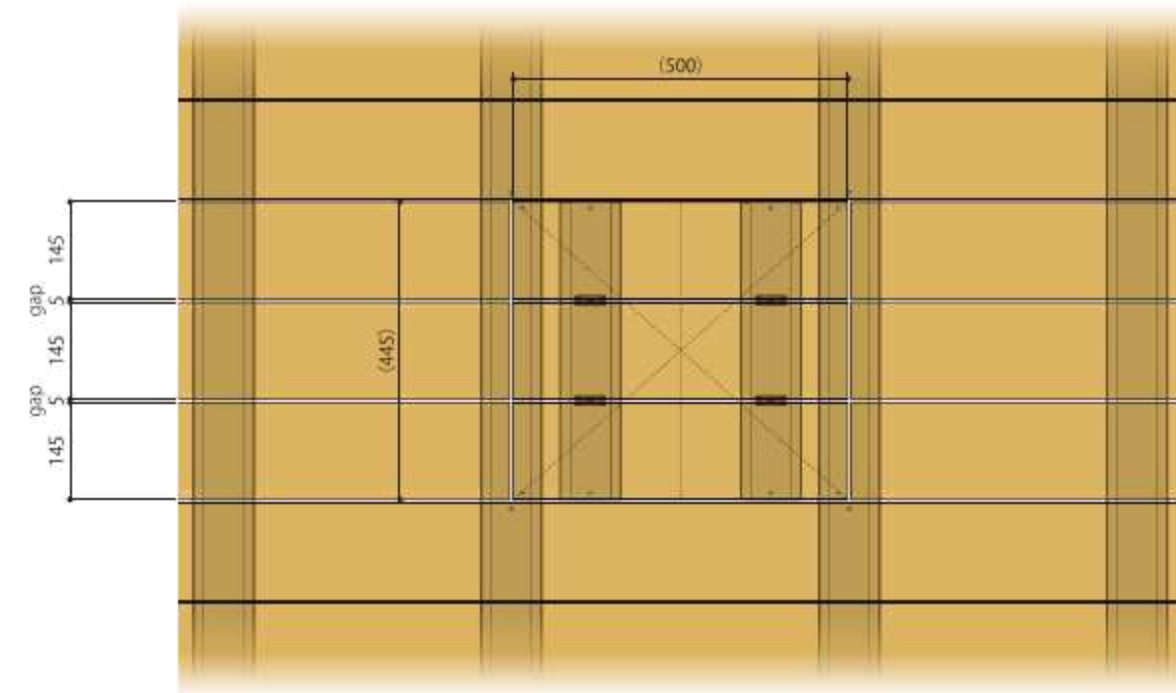
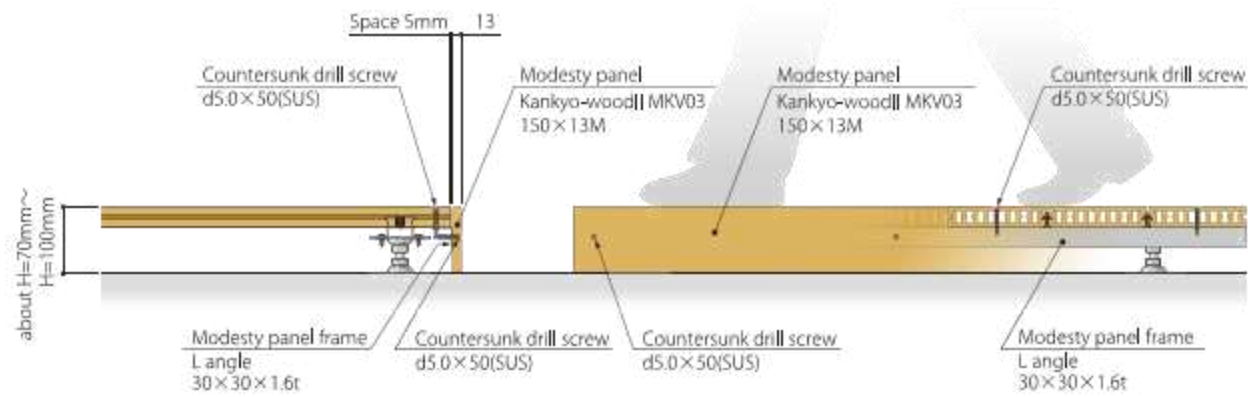
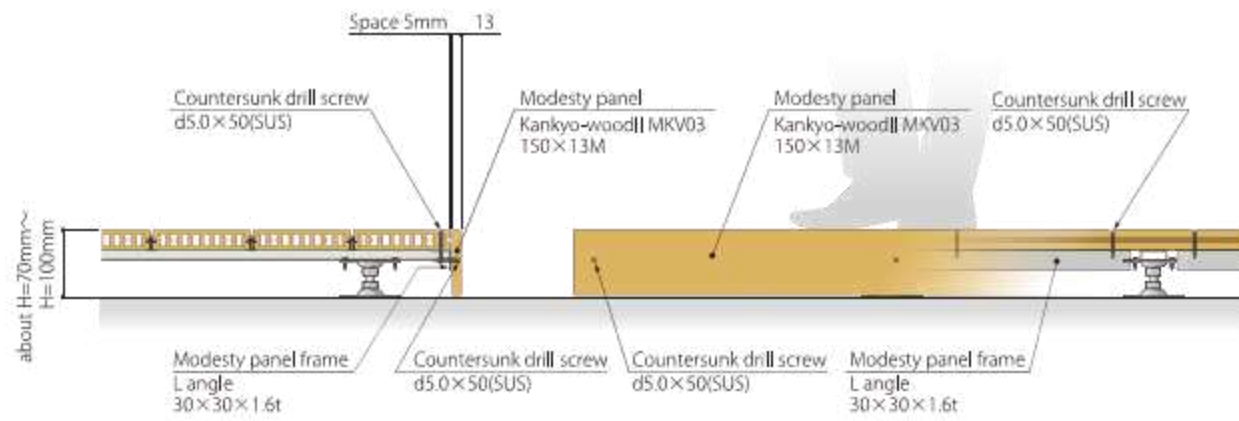


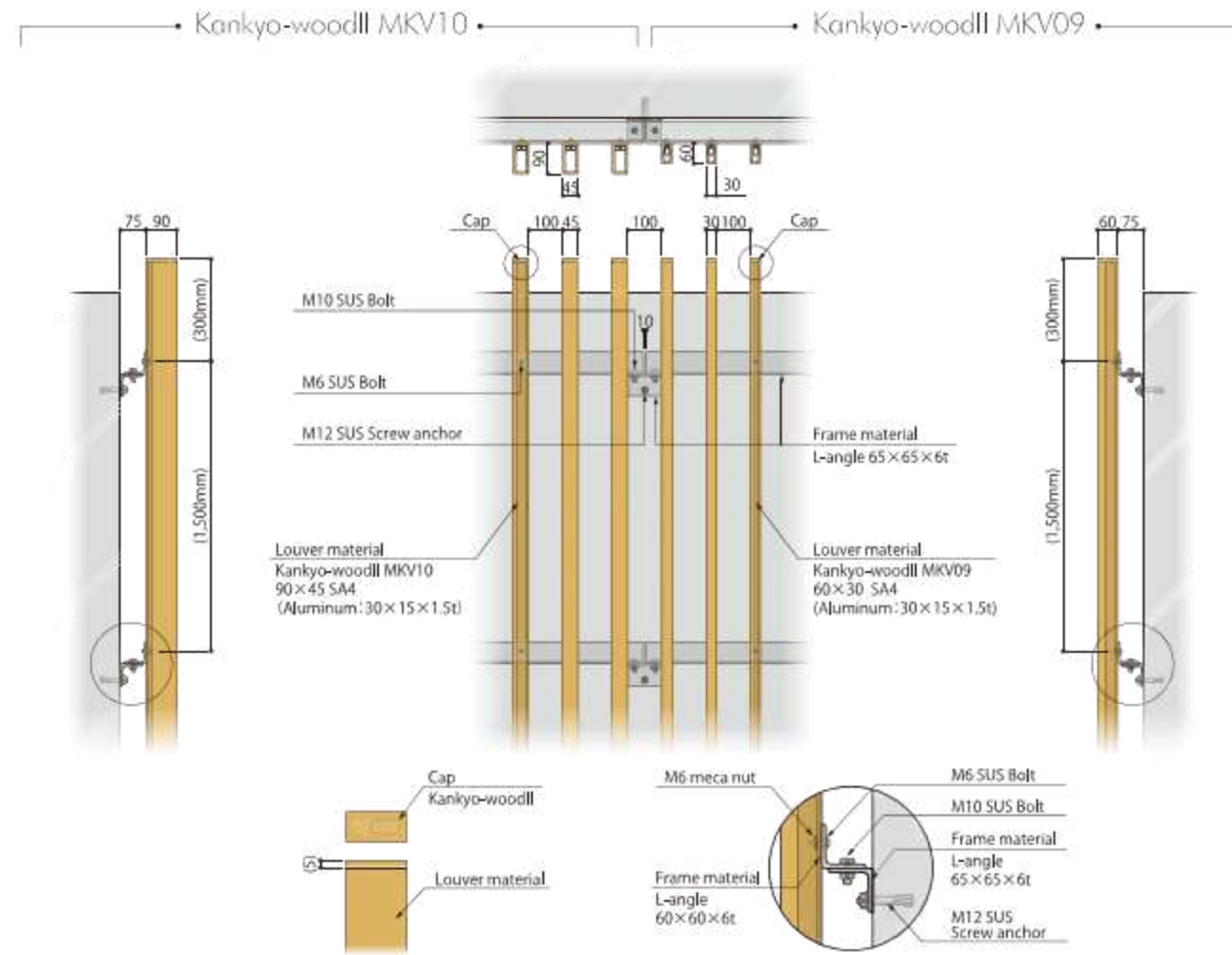


※ Above drawing is reference. Installation shall reflect actual site condition.

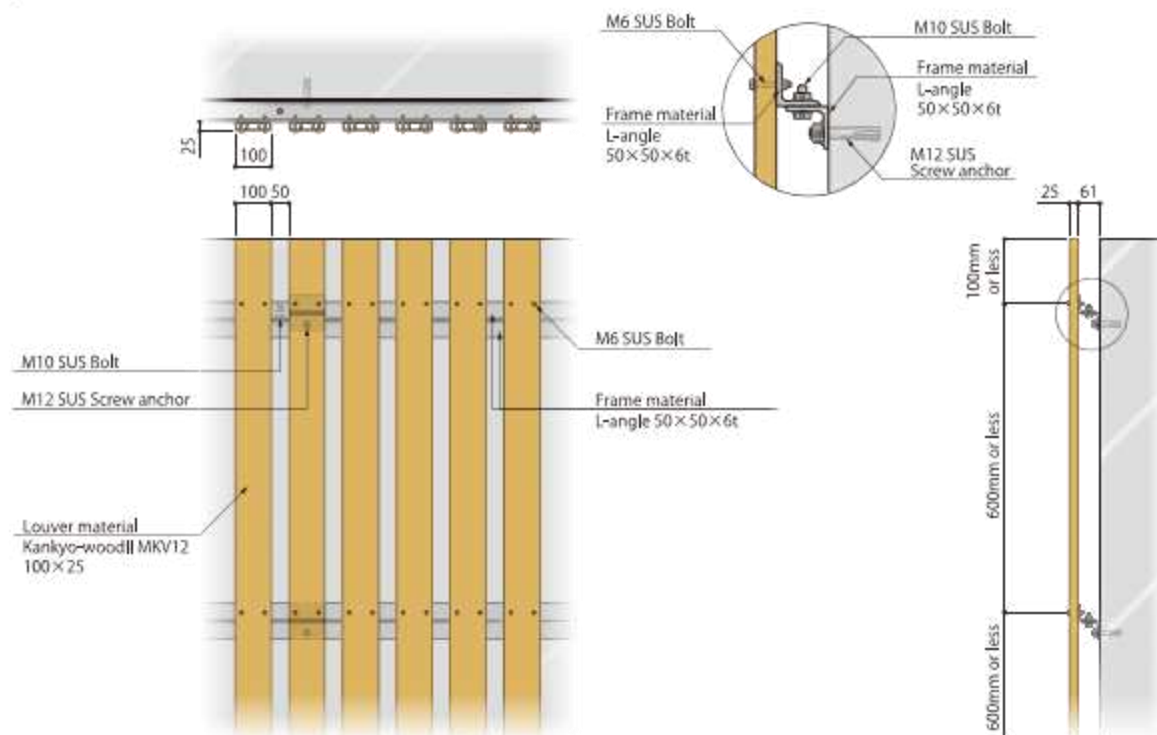


※ Above drawing is reference. Installation shall reflect actual site condition.

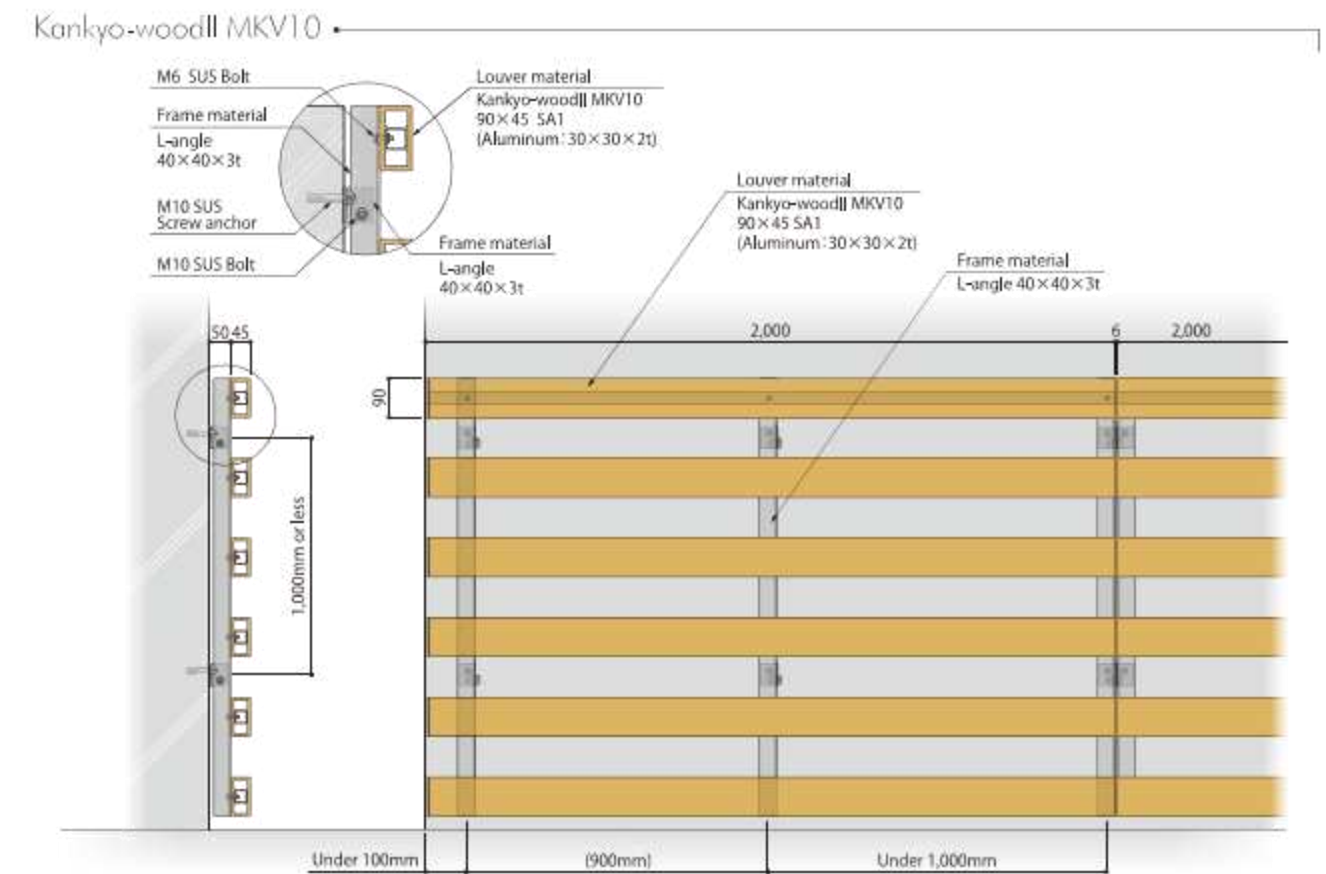




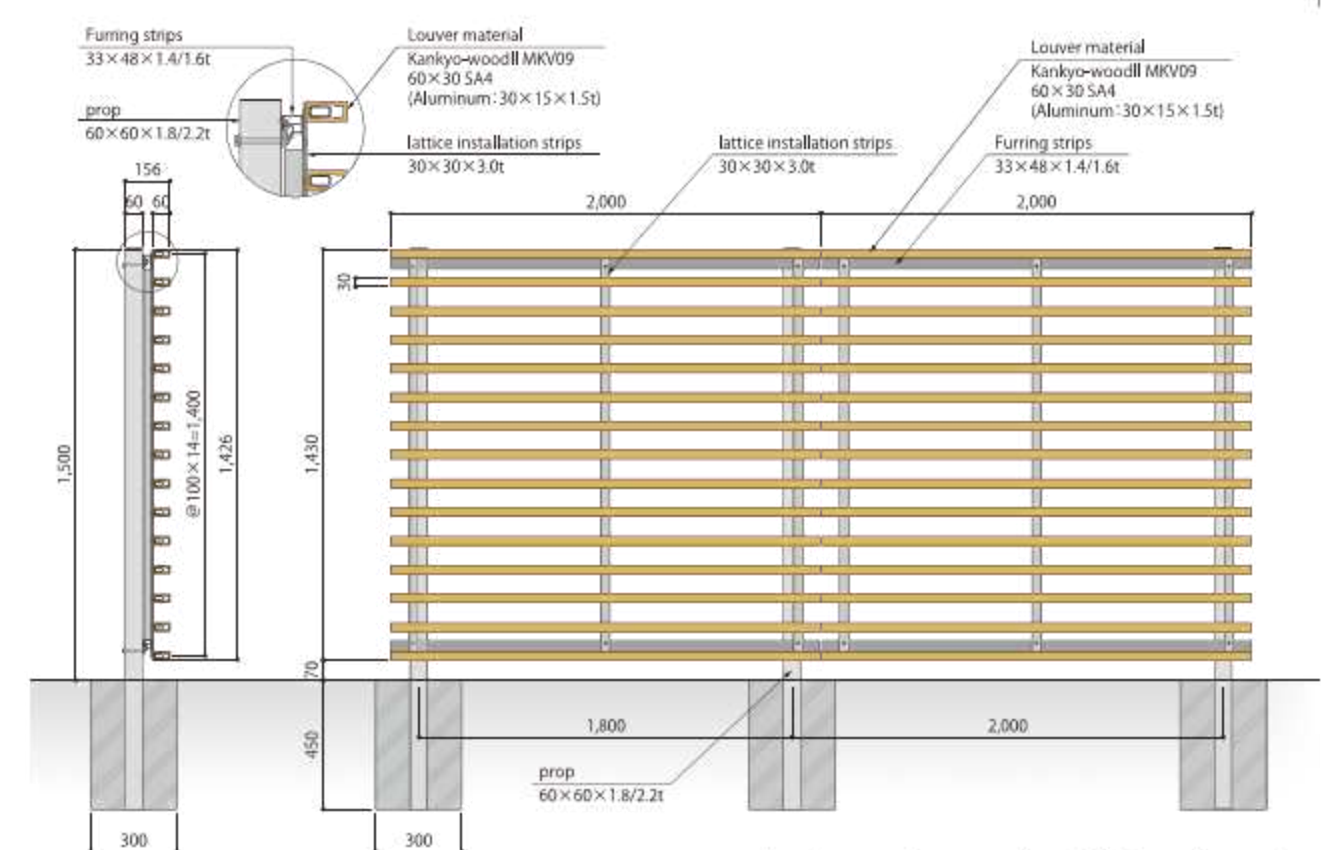
Kankyo-woodII MKV12



※ Above drawing is reference. Installation shall reflect actual site condition.



Kankyo-woodII MKV09



※ Above drawing is reference. Installation shall reflect actual site condition.

Basic Performance

Kankyo-wood II structure consist with plastic and wood. Plastics wraps around the wood powder and protects wood from termite, insect bites, corrosion. It is an environmental products that save natural wood to be cut down over again, also CO² emission during production.

Quality Performance		Kankyo-wood II	JIS A 5741	
Basic Property	Density Specific Gravity	Real Specific Gravity	1.3	0.8~1.5
	Water Absorption	Water Absorption (%)	0.5	10 or less
		Length Change (%)	Length direction:0.0 Width direction:0.0	3 or less
	Strength	Bending Strength (MPa)	23.5	20 or more
		Impact Strength (kJ/m ²)	3.1	0.5 or more
	Heat Characteristic	Deflection Temperature under Load (°C)	86.4	70 or more
	Weather Resistance	Tensile Strength Variability (%)	6	Within - 30
		Tensile Strength Variability (%)	15	Within 50
	Safety	Volatile Material	Formaldehyde (mg/L)	Ave:0.1 or less Max:0.1 or less
Toxic Material Elution		Cadmium (mg/L)	0.01 or less	0.01 or less
		Lead (mg/L)	0.01 or less	0.01 or less
		Total Mercury (mg/L)	0.0005 or less	0.0005 or less
		Selenium (mg/L)	0.01 or less	0.01 or less
		Arsenic (mg/L)	0.01 or less	0.01 or less
		Hexavalent chromium (mg/L)	0.05 or less	0.05 or less

*Test method: JIS A 5741
*Above number is test result, not gurantee.

Weather Resistance

Construction material receives UV influence in exterior use. So is the Kankyo-wood II consisted by wood powder and recycled plastic. Nevertheless, after slight color change against sunlight exposure, Kankyo-wood II still keep good color fastness in long term use.

Color fading aging test by metal weather machine test



Antiseptic

Natural wood decays while exposed natural weather condition, getting wet and dry over and over again. Kankyo-wood II is a hybrid material of wood and plastic and repels termite and fungus, enables long term use.

Reinforced corrosion test

Natural decay fungus of coriolus and tyromyces are put together with Kankyo-wood II inside the 900ml glass bottle and observed for 12 weeks. Corrosion is measured by decrease of mass of Kankyo-wood II specimen.

Kankyo-wood II mass decrease after 12weeks of reinforced corrosion test

	Kankyo-wood II	Cedar
Tyromyces	-1.6%	37.6%
Coriolus	-1.1%	16.0%

Test method: JIS-K1571 (2010)

After 12 weeks corrosion test, no mass decrease was observed.

Termite test

Reinforced termite test

Kankyo-wood II specimen and cedar specimen are put into keeping box with termite: 150 working ant and 15 soldier ant. Mass change was observed.

Mass change

	Kankyo-woodII	Cedar specimen
Decrease of mass(mg)	7.4mg	213.2mg
Decrease percentage	0.2%	15.3%

Test method: JIS-K1571 (2010)

After 3 weeks, all soldier ant died and most of working ant died at high percentage. This result shows Kankyo-woodII is not an edible food for termite. Some small termite bite could see on surface but very few to effect the strength.



Anti Slipiness

Genuine wood gets easily slippery when getting wet. Slipperiness can be measured by C.S.R. (Coefficient of slip resistance) method.

Kankyo-wood II C.S.R. rate is controlled in between 0.58 to 0.65 level in dry and wet condition that is hard to slip.

	Surface	Direction	C.S.R. rate
Dry	Flat surface	Length wise	0.59
		Width wise	0.58
	Rib surface	Length wise	0.58
		Width wise	0.63
Wet	Flat surface	Length wise	0.60
		Width wise	0.60
	Rib surface	Length wise	0.60
		Width wise	0.65

Test method: JIS A 1454

Test institute: Japan testing center of construction material

What is C.S.R.(Coefficient of slip resistance) method...

It is measured by original slippery level test machine. Its deviation range is considered between 0.00 to 0.99 level. The number the smaller, more slippery it gets. The number the higher, less slippery it gets. Number specially less than 0.4 level is considered to be slippery and dangerous. Quote: Center of better living Japan




Tokyo welfare building construction manual defines the C.S.R. level as follows:

	C.S.R. level
Walking with shoes	0.4~0.9
Waking with indoor shoes	0.35~0.9
Waking with bare feet	0.45~0.9
Inclined slope	0.5~0.9

Antistatic

In the real world, some material easily conduct electricity but some do not. WPC contains plastic that does not conduct electricity easily. To avoid static, Kankyo-wood II is added special anti statics chemical in it. Therefore Kankyo-wood II deck can avoid static and spark when human touches metal after walking on the decks.

Surface electric resistance (Ω)	
Conventional products	1.3×10^{13}
	
Kankyo-wood II (Anti-static version)	2.0×10^{11}

Static level reference		
	Static level (kV)	Electric resistance level (Ω / □)
	Slight (0.1 or less)	10^{10} or less
	Fair (0.1~1)	$10^{10} \sim 10^{12}$
	Quite (1~10)	$10^{12} \sim 10^{14}$
	Big (10 or more)	10^{14} or more

*Factory control criteria, not guarantee.
*Measured condition: 23°C temperature, 60% humidity

National institute of occupational safety and health, Japan

Kankyo-wood II has electric resistance less than $10^{11} \Omega$ and its resistance level is fairly small. It is also being tested through human being actually walking on the decks over 50 steps and touching metal. Conventional product may create the electricity but Kankyo-wood II did not create.



Statics structure

Material consists of atom.

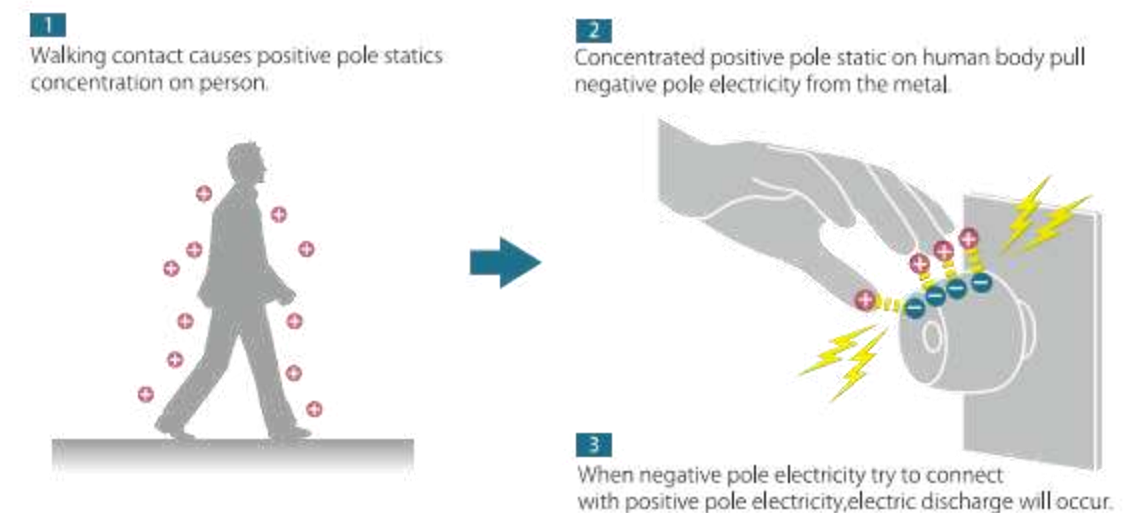
Atom consists of nucleus with positive pole proton and electron with negative pole.

In normal status, negative electron and positive pole proton are at the same quantity level and balanced (OV status).

When atom contacts with other atom, it starts moving its electron to another.

This is how statics is caused.

When two material contact, their atom start electrical charge separation without fail and thus statics will be created.



Feature of Kankyo-wood II

Please read the following cautions carefully for the long, safe use of Kankyo-wood II.

Color

- It is utilizing recycled raw material for environmental ecology. Therefore, it may have certain color variety.
- Surface is being sand finished. It is sanded in one direction and surface texture appearance may differ when seen from sanding forward direction or reverse direction. It may have wood powder remained on surface. These powders can be removed by wiping cloth. Be careful to put bed sheets, blanket, clothes on over it, may catch powder. In case the powder is caught, powder can be removed by washing. (Some cloth type and ambience may cause strong stain. Wash off swiftly after being colored)
- It is made from natural wood powder. It may cause a colored water when being wet soaked by rain. This is due to natural wood color but does not effect strength or durability.

Color

- Kankyo-wood II is made from recycled plastic and wood. Its color fastness may change when being exposed to sunshine and weather. However after initial change, its long term color fastness is more stable than genuine wood.

Fungus

- It is made by wood powder and by plastics, and does not corrode like wood. However, surface wood portion may have chance to catch fungus depending on the ambience. In case fungus happens, follow instruction for cleaning.

Precaution for use

Read and follow instruction carefully to use safely.

Dirt and Stain

- Stain may caused depending on situation. In case the surface is stained, please clean and remove stain before it gets heavy stain.
- Please do not leave cans or iron products above WPC. Rust may create stain.
- In case surface is contaminated by oil, fuel or gasoline, please remove it by cloth as soon as possible. They may cause color and material effect.

Fire

- Kankyo-wood II is not fire retardant. It may be burned when putting on fire, as well as general wood.
- Avoid making fire on above Kankyo-wood II.
- Avoid putting portable cooker on Kankyo-wood II. Heat may create color and material effect.
- Kankyo-wood II does not have fire distinguishing function. Please use fire distinguisher when caught fire.
- Avoid exposure to heater or hot water supply equipment close to it. Heat may create color and material effect.
- Kankyo-wood II would not create any toxic gas when being burned.

Surface temperature

- Surface may get heated during sunny day. Use shoes, sandals on it. Pay special attention to infant, small children walking or playing on it.

Heat Expansion and Shrink

Kankyo-wood II is made from wood powder and plastics. All plastic has thermal linear expansion character. Kankyo-wood II is designed to have appropriate linear expansion performance under designed installation method. Be aware the size may differ within the tolerance.

Material Expansion (mm) = Linear Thermal Expansion Coefficient: $4.1 \times 10^{-5} / ^\circ\text{C}$ \times temperature ($^\circ\text{C}$) \times material length (mm)

Example) material length 2000mm / temperature gap 30°C \Rightarrow $2000 \text{ mm} \times 30^\circ\text{C} \times 4.1 \times 10^{-5} / ^\circ\text{C} = 2.46 \text{ mm}$

Load

- Kankyo-wood II is designed for foot walking decks. It is not suitable to be used for bicycle, motor bicycle, car traffics.
- In case heavy weight things shall be put on over, Use big plank board underneath the heavy weight things to avoid concentrated load.
- Do not drop heavy weight things. It may create cracks on the edge or corner.
- In case putting heavy weight things on Kankyo-wood II long hours, it may create the deformation.
- Do not jump, hang, climb on WPC. Avoid the risk of get hurt and injured.

Other cautions

- Installation method is designed to have gap between planks. Please be careful not to put fingers between.
- It may get slippery when being wet and soaked.
- WPC contains plastics and may warp. Kankyo-wood II may warp but under designed appropriate warping tolerance that match designated installation method.
- Do not poke WPC with sharp sticks, umbrella pole etc. It may cause damage.
- There is no need to put maintenance wax or anti-corrosion treatment.
- Kankyo-wood II will not have have split, thorn.

Maintenance

Kankyo-wood II does not need as much maintenance as genuine wood. However, under some ambience like snow, rain, water may leave stain on the surface. Stain may get remained after leaving long hours and should be taken care periodically. Areas close to industrial and ocean front may effect surface more than other areas and shall be taken care periodically too.

Precautions for maintenance

- When wiping surface, do not use any benzine, thinner, alkali, acid type of liquid.
- In case dripping colored water on surface, please remove them by cloth smoothly.
- Use soft cloth, or sponge for wiping.
- Do not use scrubbing powder, metal brush, steel wool, spatula, rough sand paper.
- In case of washing, please use diluted neutral detergent.
- Wipe off the detergent completely after washing. Remained detergent may create color change.
- Remove pebbles, stones and sands before wiping. It may create scratches while wiping.
- High pressure hydro washer may be used, but please test it with the edge of products and adjust pressure before starting washing.

Daily care

- When wiping surface, do not use any benzine, thinner, alkali, acid type of liquid.
- In case dripping colored water on surface, please remove them by cloth smoothly.
- Use soft cloth, or sponge for wiping care.

Light dirt, stain

- Wipe the product along longitude direction using wet sponge or cloth.

Heavy dirt, stain

- Use diluted neutral detergent and wash the surface. Remove the detergent completely after washing.

Other maintenance

- In case the gaps are filled by fallen leaves or rubbish, remove them because it may interfere water drainage.
- DO NOT loosen bolt and screws. It may cause structure damage and danger.
- Check the bolt and screw tightness periodically.
- Check the bolt, screws to see tightness of installation especially after taiphoon, earthquake attacks.

Cleaning method



Burn

This level of burn or stain can be removed by using sand paper. Prepare sand paper about # 24-40. Sand the burnet area evenly along the longitude direction. Remove the powder after sanding. ※ Sanded area may have color difference between other areas.



After sanding



Rain marks, water stain

Use diluted neutral detergent to remove the stain. Wash the diluted neutral detergent and clean the surface by cloth or sponge. Do not use metal brush. Plastic brush may be used, but check the surface status when using plastic brushes.



Strong stain

Use cloth dipped breach diluted by water. After removing the stain by cloth, wash off with water and dry with cloth.



Do not use bleach