

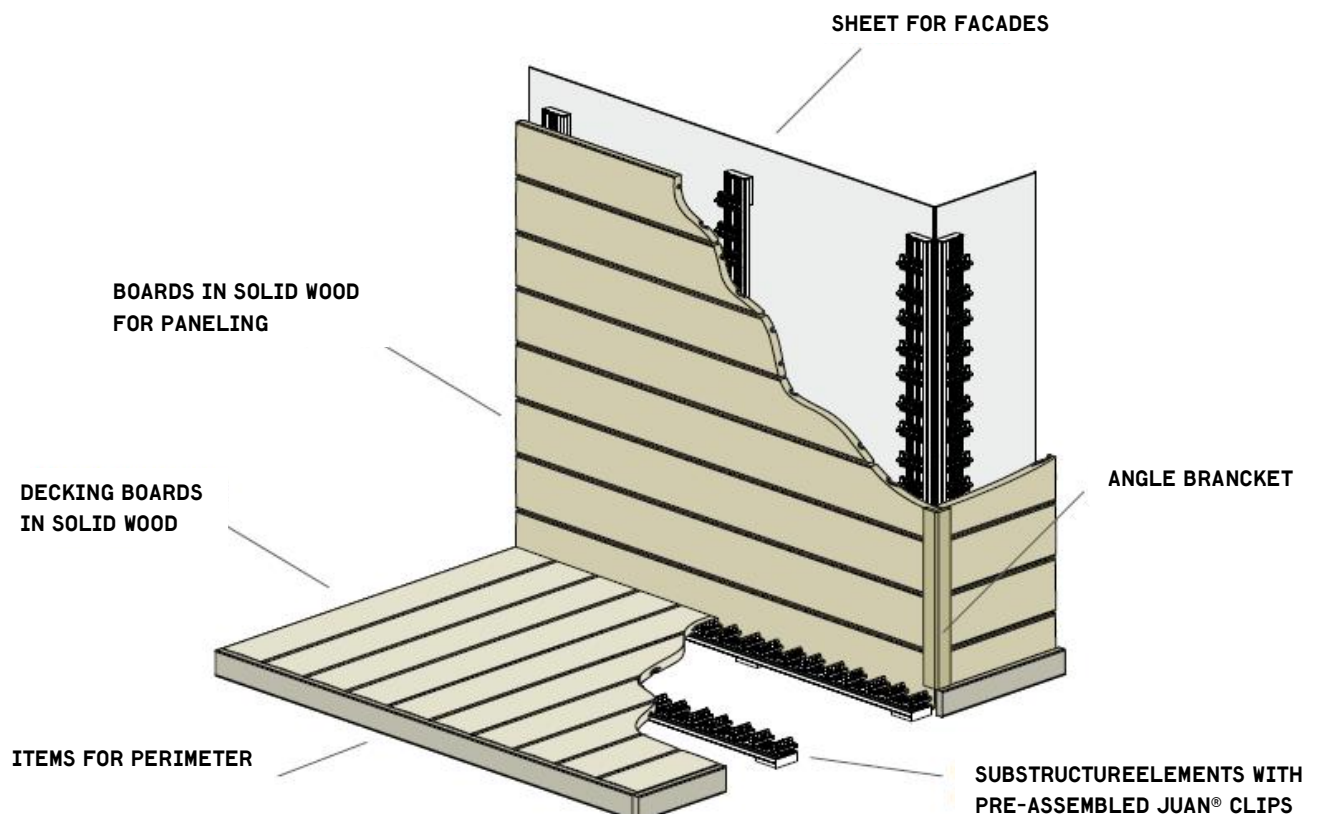
LISTONE GIORDANO DECKING

OUTDOOR WOOD FLOORS

Listone Giordano outdoor decking is a raised structure consisting of wooden planks fixed to an aluminium substructure by means of an original and patented mechanical system.

The JuAn® fixing system consists of clips made of a special synthetic material resistant to temperature changes and weathering. It makes it possible to halve the laying times and to perform the various operations without using screwdrivers, nails and screws.

This system is also suitable for wall application.



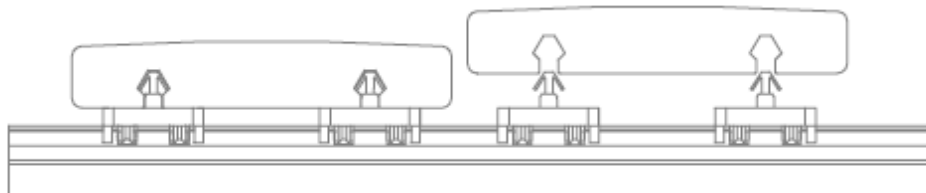
CHARACTERISTICS

WOOD DECKING BOARDS

The convex profile represents the best solution in terms of comfort, dimensional stability and water runoff from the surface.

The longitudinal incisions on the back of the planks allow fast jointing to the substructure and gives great stability against twisting.

Solid decking boards are supplied in Ash from Fontaines, Tek two-layer and Ipé.



CLIPS

The **JuAn®** Clips in high resistance polyoxymethylene for outdoor use, perfectly anchored to the aluminium substructure, assure perfect tightness of the boards to the substructure.

The innovative, full removable system allows the boards to be removed and replaced for easier installation, inspection and routine maintenance operations.

FINISHES

The boards can be supplied in the version **Outnature** and **unfinished wood**.

OUTNATURE

Outnature, the innovative outdoor finishing system with an oil base, deeply conditions wood, creating a protective barrier against ageing and cracking. The finishing is industrially applied on all the faces, including sides, heads and the bottom surface. The Outnature finishing system entails application of the first protective layers in the production stage, while an additional layer also having slip-proof properties is applied immediately after laying. The products required for application of the last layer are supplied with the floor.

Unlike conventional oils, OUTNATURE does not darken the wood surface and does not require sanding during maintenance.

With its special formula, OUTNATURE prevents risks of cracking due to typical application of water-based products during the summer and on woods that are particularly resistant to humidity such as thermally treated ash.

The Outnature finish is available for Ash of Fontaines, Tek two-layer wood flooring and Ipé.

UNFINISHED WOOD

The decking boards with raw wood surface predisposed to be finished in work after laying.

The finishing treatment protects the wood from oxidation phenomena generated by UV rays, as well as limits the formation of fissures and cracks generated by climatic conditions.

It is advisable to protect the wood after installation and especially on end side using oil or paraffin.

DURABILITY OF OUTDOOR WOOD

The durability of wood is defined as the capacity to withstand the attacks of wood decay. Biological durability can be **natural** (as the case of Teak and Ipé) if conferred by naturally extracts of wood, or **induced** (as the case of Heat treated Ash) if conferred by a specific treatment.

The long lasting of a wooden deck depends on the biological durability of the wood, also from the constructive characteristics and from the weather conditions where it is built. Class of durability and class of use for outdoor use are defined by international standard specifications.

UNI EN 350 - Durability of wood and-based products. Natural durability of solid wood. Guide to the principles of testing and classification of the natural durability of wood.

CLASS	DESCRIPTION	LIFE EXPECTED	WOOD
1	very durable	> 25 years	Heat treated Ash, Teak, Ipè
2	durable	15-25 years	Chestnut
3	middly durable	10-15 years	Larch
4	slightly durable	5-10 years	Poplar, Spruce
5	not durable	< 5 years	-

The natural resistance towards the wood decay can identify the class of use, different for each kind of wood. Use of wood in residential home is defined by international standard EN 335.

UNI EN 335 - Durability of wood and wood-based products - Definition of classes

CLASS	DESCRIPTION	MOISTURE CONDITION	USE
I	wood for indoot use	always under 20%	wood floor, furniture
II	wood not soil contact	occasionally above 20%	beams and wood for structural use
III	wood for outdoor use, not soil contact	often above 20%	decking, cladding, windows
IV	wood for soil contact	permanently above 20%	fences, street furniture, banks
V	wood in water conditions	water immersion	mooring fences

DIMENSIONAL STABILITY

Wood placed outdoor is stressed by frequent, sudden and substantial changes in its moisture content due to direct sunlight, which leads to a low moisture level (even as low as 4%) and, by opposite effect, due to meteoric precipitations which makes the wood moisture rise enormously (even over 27%). For this reason is natural that expansion and withdrawal phenomena occurs in planks subjected to moisture variation, with possible formation of cracks, deformations of the lists in longitudinal and / or transverse section, etc.

The tendency to show dimensional variations also derives from the nature of the wood itself and from the dimensional ratio of the planks. At the same wood specie, the boards will be more stable as lower will be the ratio between width and thickness. As a result, the narrower lists (for example, 90 mm) exhibit better dimensional stability over time.

Potential stagnations of rainfall in the lower side of decking, which are mainly removed by evaporation, generate dangerous stresses caused by the moisture gradient between top (dry) and bottom (wet) surfaces of the boards. This phenomenon generates a high deformation and a consequent manifestation of cracks.

HEAT TREATMENT OF WOOD

Wood, in the form of raw material, is subjected to a cycle of drying, constant temperature treatment and final conditioning. The treatment temperature, applied according to a specific quality regulation, favors the development of spontaneous reactions without chemical products addition. This process favors the evolution of wood chemical structure and the consequent elimination of hemicellulose and simple sugars. The absence of nutritional resources for the growth of pathogens and the low hygroscopic of the material avoid the biological decay and make the heat-treated wood particularly suitable for outdoor use.

Wood colour results from the grade of treatment and from the application time. A remarkable aesthetic aspect is given by the change in colour and by the enhancement of the wood fibre.

Ash wood, naturally not very durable in outdoor, obtains high durability levels after the thermo-treatment. Laboratory tests conducted by wood technology institute Arts et Métiers ParisTech de Cluny e Lermab di Epinal, certify that Ash wood treated with Margaritelli ThermoWood® cycle, is durable in class 1 (EN350-2) and use class IV (EN 335-2). Therefore ThermoWood® Ash can be used in contact with the ground.

LISTONE GIORDANO DECKING**Decking Ash 90 and 120**

Heat-treated Ash from Fontaines

The respect of the environment and the sustainable management of the resources are the main values guiding the development of the heat-treated Ash, a widespread wood species in the French forests, features ideal technical characteristics and mechanical resistance. The steam heat-treatment, chemicals-free, improves the durability and dimensional stability of the product required for outdoor application. Brushing enhances the surface of heat-treated wooden floors, highlighting the beauty of the fibres and making it remarkably non-slip.



ORIGIN: France

LENGTHS: 1200-1600-2000-2400 mm ⁽¹⁾

WIDTH: 91-119 mm

TOTAL THICKNESS: 21 mm

WEIGHT: 14 kg/m² approx.

SURFACE: brushed

END SIDE PROFILE: squared edge

DISTANCE BETWEEN BOARDS: 5 mm

DISTANCE BETWEEN JOISTS: 400 mm

FINISHING: - OUTNATURE (high oil based finishing for outdoor use)

- UNFINISHED WOOD (to be finished on site)



(1) Lengths supplied with a tolerance of 2 mm. The boards are supplied in different lengths depending on availability

PHYSICAL AND MECHANICAL PROPERTIES (source *Centre Arts et Métiers ParisTech de Cluny*)

Density ρ (EN 408)	650 kg/m ³
Modul of elasticity E mean (EN 408)	19.32 kN/mm ²
Bending strength f_k (EN 408)	41,13 N/mm ²
Mechanical class (EN 408)	D40
Brinell Hardness (EN 1534):	33,0 N/mm ²
Moisture content	4 \pm 1%

BIOLOGICAL DURABILITY (source *Centre Arts et Métiers ParisTech de Cluny*)

Biological durability (EN 350-2)	Class 1
Class of risk/use (EN 335-2)	Class IV
Expected wood lifetime	25 - 30 years

PROFILES

CLIPS JuAn® PROFILE



END SIDE PROFILE

Decking Teak 135

It's a two layer decking for outdoor use. It uses a series of patented technologies deriving from research and Listone Giordano experience in the field of two layers flooring with birch plywood.

It's composed of a top layer in Teak and a birch plywood support for a total thickness of 23 mm. The union is made by high performance adhesives which exceed the requirements of JAS Type II test (immersion for 2 hours in hot water at 70°C and subsequent exposure in a laboratory oven with forced ventilation at 60°C for 3 hours).

Characterized by a wood fibre with a golden brown colour, Teak wood represent one of finest woods ever.

It's a wood originating from the South East Asian area, characterized by good mechanical strength and excellent stability towards dimensional variations. The presence of natural extractives characterizes the appearance of this wood favoring a natural and high biological durability against insects and pathogens. The outdoor oil treatment gives Teak flooring elegance and uniqueness.



ORIGIN: Asia (Burma)

LENGTHS: 1200-1500-1800-2100-2400 mm ⁽¹⁾

WIDTH: 135 mm

TOP LAYER: 5 mm

TOTAL THICKNESS: 23 mm

SUPPORT: birch plywood

WEIGHT: 14 kg/m² approx.

SURFACE: smooth

END SIDE PROFILE: squared edge

DISTANCE BETWEEN BOARDS: 5 mm

DISTANCE BETWEEN JOISTS: 300/400 mm

FINISHING: - OUTNATURE (high oil based finishing for outdoor use)

(1) Lengths supplied with a tolerance of 2 mm. The boards are supplied in different lengths depending on availability.

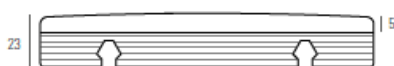
PHYSICAL AND MECHANICAL PROPERTIES *(source CIRAD)*

Density ρ	650 kg/m ³
Modul of elasticity E mean	13750 MPa
Bending strength	98 MPa
Monnin Hardness	4,8
Saturation fiber	24%
Moisture content	14 \pm 2%

BIOLOGICAL DURABILITY *(source CIRAD)*

Biological durability (EN 350-2)	Class 1
Class off risk (EN 335-2)	Class IV
Expected wood lifetime	25 - 30 years

PROFILES



CLIPS JuAn® PROFILE



END SIDE PROFILE

Decking Ipé 90 and 135

Ipé is a wood specie native of South America, traditionally used all over the world for outdoor flooring. Its high resistance against mechanical stresses and its high content of natural extractives make this wood specie particularly suitable for highly stressed pedestrian areas in which an excellent biological durability of outdoor woods is required. The quality control of wood moisture content and the rational relationship between width and thickness of the boards give a good dimensional stability of Ipé decking floor. All this in the full compliance of international laws regarding outdoor floorings.



ORIGIN: Brazil

LENGTHS: 900-1200-1500-1800-2100 mm ⁽¹⁾

WIDTH: 91-135 mm

TOTAL THICKNESS: 21 mm (for 91 mm width) – 23 mm (for 135 mm width)

SUPPORT: birch plywood

WEIGHT: 14 kg/m² approx.

SURFACE: smooth

END SIDE PROFILE: squared edge

DISTANCE BETWEEN BOARDS: 5 mm

DISTANCE BETWEEN JOISTS: 300/450 mm

FINISHING: - OUTNATURE (high oil based finishing for outdoor use)

- UNFINISHED WOOD (to be finished on site)

(1) Lengths supplied with a tolerance of 2 mm. The boards are supplied in different lengths depending on availability.

PHYSICAL AND MECHANICAL PROPERTIES *(source CIRAD)*

Density ρ	1040 kg/m ³
Modul of elasticity E mean	22760 MPa
Bending strength	166 MPa
Monnin Hardness	14,6
Saturation fiber	20%
Moisture content	16 \pm 2%

BIOLOGICAL DURABILITY *(source CIRAD)*

Biological durability (EN 350-2)	Class 1
Class of risk/use (EN 335-2)	Class IV
Expected wood lifetime	25 - 30 years

PROFILES



CLIPS JuAn® PROFILE

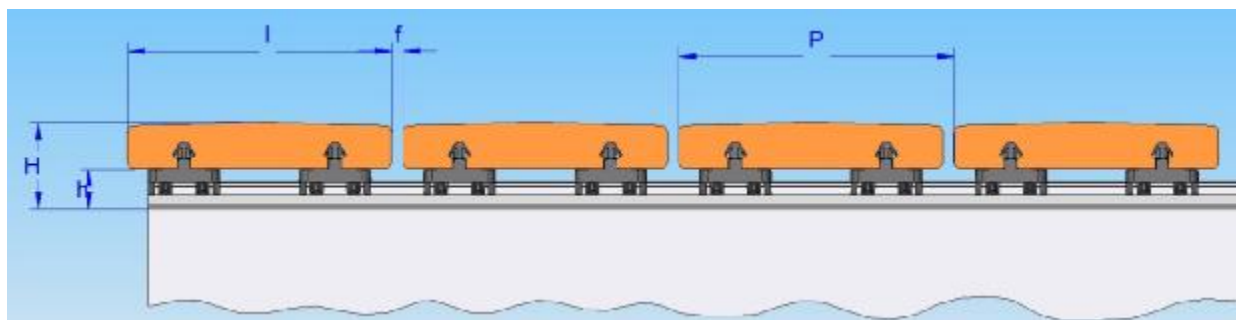


END SIDE PROFILE

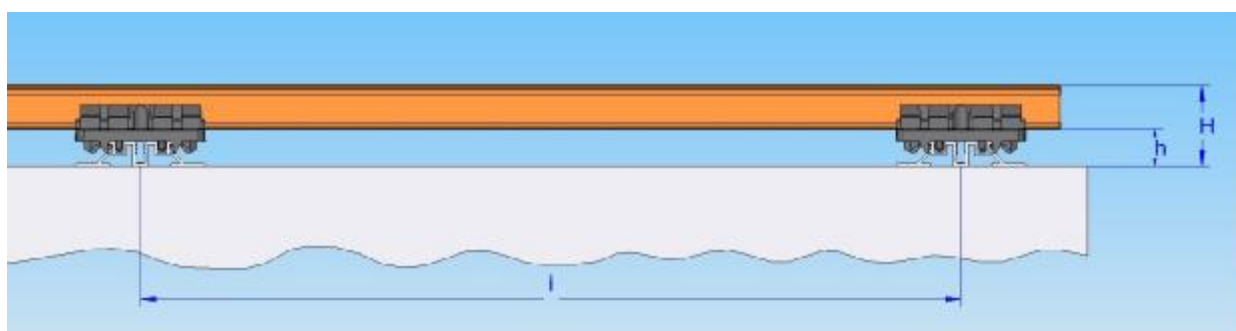
SUBSTRUCTURE DECKING FIXED HEIGHT

KIT 40

Fixed height substructure in aluminium with pre-assembled clips JuAn®. It is the basic solution for flooring on consolidated plans and waterproofing sheath. It promotes drainage of rainwater parallel to the substructure only.



Picture 1: cross section of wooden planks laid solid aluminium substructure KIT 40 fixed height



Picture 2: longitudinal section of the planks in solid fixed aluminium substructure KIT 40 fixed height

Table 1

Characteristics KIT 40	Ash 90	Ash 120	Tek 135	Ipé 90	Ipé 135
Thickness wood mm	21	21	23	21	23
Width wood mm (l)	91	119	135	91	135
Distance between boards mm (f)	5	5	5	5	5
Pitch width mm (P)	96	124	140	96	140
Height substructure mm (support quota) (h)	18	18	18	18	18
Total height thickness mm (H)	39	39	41	39	41
Aluminium joist length mm	2400	2356	2400	2400	2380
Distance between joists mm (i)	400	400	300/400	300/450	300/450

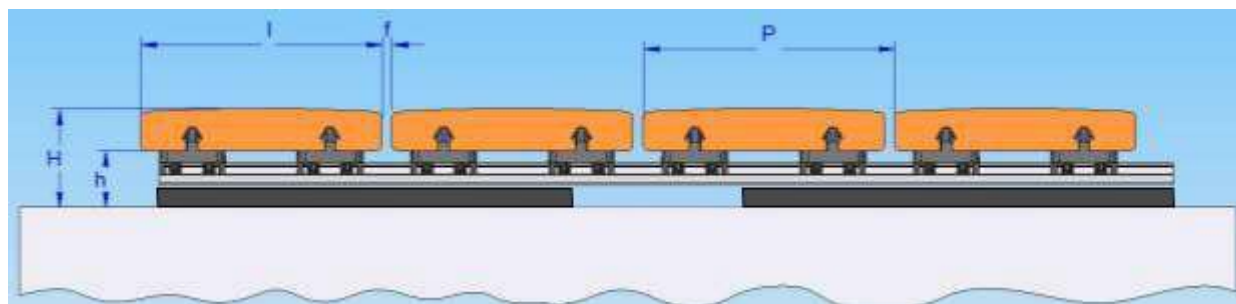
FIXING ON THE GROUND: Fixing the structure is not compulsory. It is possible to fix the aluminium substructure KIT 40 to the ground, predrilling the rails and using screws 7,5x70 mm. The number of screws is variable between 2.5-3.0 pcs/sqm and distanced along the substructure like 1.0/1.5 m each other. It's recommended to carefully value the possibility of drilling to avoid humidity infiltration between concrete or brick soil.

INSTALLATION ON SHEATH: fixing the substructure KIT 40 directly on the insulating sheath could involve sheath laceration over time.

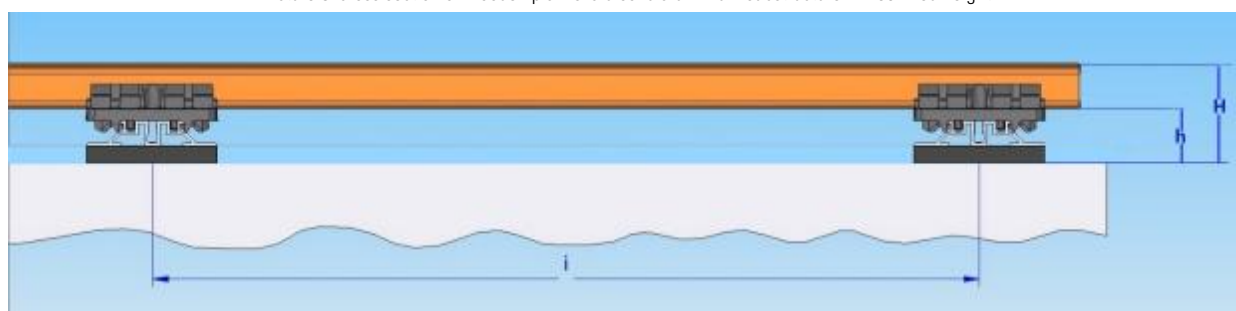
We recommend to use of rubber shims 62,5x430x5mm (thickness) to protect the surface. The shims are equipped with an adhesive surface for fixing below the structures at a distance of 60 mm each other (490 mm wheelbase).

KIT 50

Substructure fixed height in aluminium with rubber shims and clips JuAn® pre-assembled fixing system for installation of floorings on solid surfaces. It allows drainage of rainwater in all directions. The rubber shims can cushion the noise generated by the solicitation exerted on the structure.



Picture 3: cross section of wooden planks laid solid aluminium substructure KIT 50 fixed height



Picture 4: longitudinal section of the planks in solid fixed aluminium substructure KIT 50 fixed height

Table 2

Characteristics KIT 50	Ash 90	Ash 120	Tek 135	Ipé 90	Ipé 135
Thickness wood mm	21	21	23	21	23
Width wood mm (l)	91	119	135	91	135
Distance between boards mm (f)	5	5	5	5	5
Pitch width mm (P)	96	124	140	96	140
Height rubber shims (62,5x430 mm) mm	10	10	10	10	10
Height substructure mm (support quota) (h)	28	28	28	28	28
Total height thickness mm (H)	49	49	51	49	51
Aluminium joist length mm	2400	2356	2380	2400	2380
Distance between joists mm (i)	400	400	300/400	300/450	300/450
N. rubber shims per substructure element	5	5	5	5	5
Longitudinal distance between rubber shims (mm)	490	490	490	490	490

FIXING ON THE GROUND: Fixing the structure is not compulsory. It is possible to fix the aluminium substructure KIT 50 to the ground, predrilling the rails and using screws 7,5x70 mm. The number of screws is variable between 2.5-3.0 pcs/sqm and distanced along the substructure like 1.0-1.5 m each other. It's recommended to carefully value the possibility of drilling to avoid humidity infiltration between concrete or brick soil.

INSTALLATION ON SHEATH: The use of rubber shims for Kit 50 allows the installation without damaging the sheath.

RUBBER DISTANCE: The supports (62,5 x 430 x 10 mm), equipped with an adhesive surface for fixing below, have to be placed below the structures at a distance of 60 mm each other (490 mm wheelbase).

KIT 60

Substructure fixed height in aluminium with rubber shims and clips JuAn® pre-assembled. For installation of floors on solid surfaces and waterproofing sheet. It promotes drainage of rainwater in all directions. The rubber shims can cushion the noise generated by the solicitation exerted on the structure.

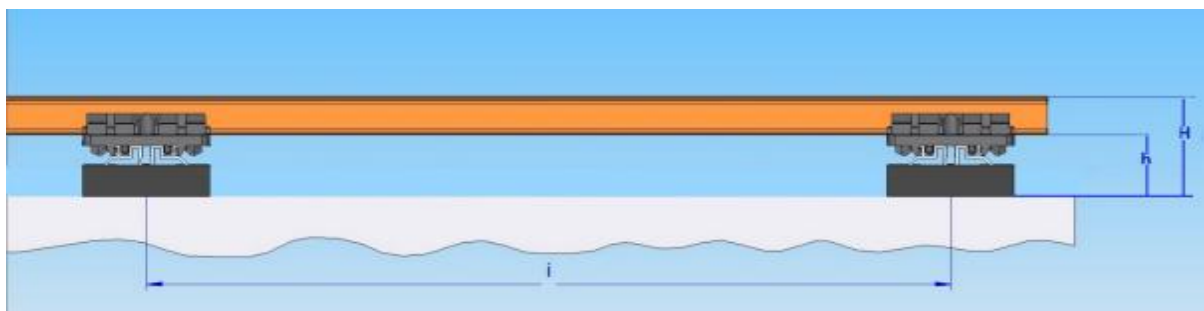
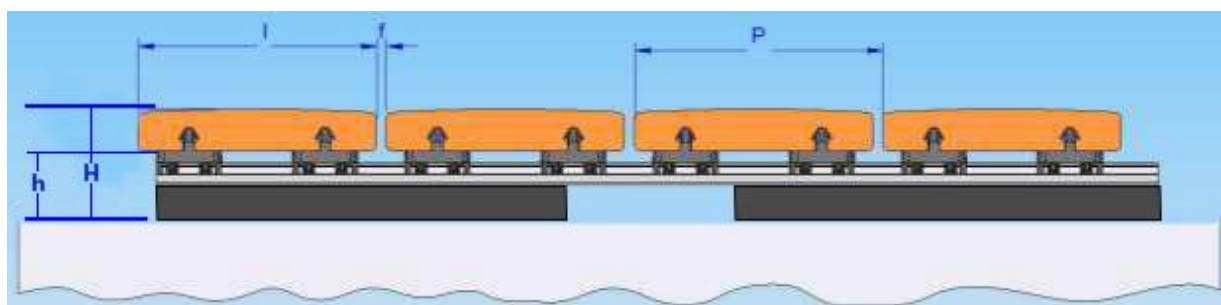


Figure 5: cross section of wooden planks laid solid aluminium substructure KIT 60 fixed height



Picture 6: longitudinal section of the planks in solid fixed aluminium substructure KIT 60 fixed height

Table 3

Characteristics KIT 60	Ash 90	Ash 120	Teak 135	Ipé 90	Ipé 135
Thickness wood mm	21	21	23	21	23
Width wood mm (l)	91	119	135	91	135
Distance between boards mm (f)	5	5	5	5	5
Pitch width mm (P)	96	124	140	96	140
Height rubber shims (62,5x430 mm) mm	20	20	20	20	20
Height substructure mm (support quota) (h)	38	38	38	38	38
Total height thickness mm (H)	59	59	61	59	61
Aluminium joist length mm	2400	2356	2380	2400	2380
Distance between joists mm (i)	400	400	300/400	300/450	300/450
N. rubber shims per substructure element	5	5	5	5	5
Longitudinal distance between rubber shims (mm)	490	490	490	490	490

FIXING ON THE GROUND: Fixing the structure is not compulsory. It is possible to fix the aluminium substructure KIT 50 to the ground, predrilling the rails and using screws 7,5x70 mm. The number of screws is variable between 2.5-3.0 pcs/sqm and distanced along the substructure like 1.0-1.5 m each other. It's recommended to carefully value the possibility of drilling to avoid humidity infiltration between concrete or brick soil.

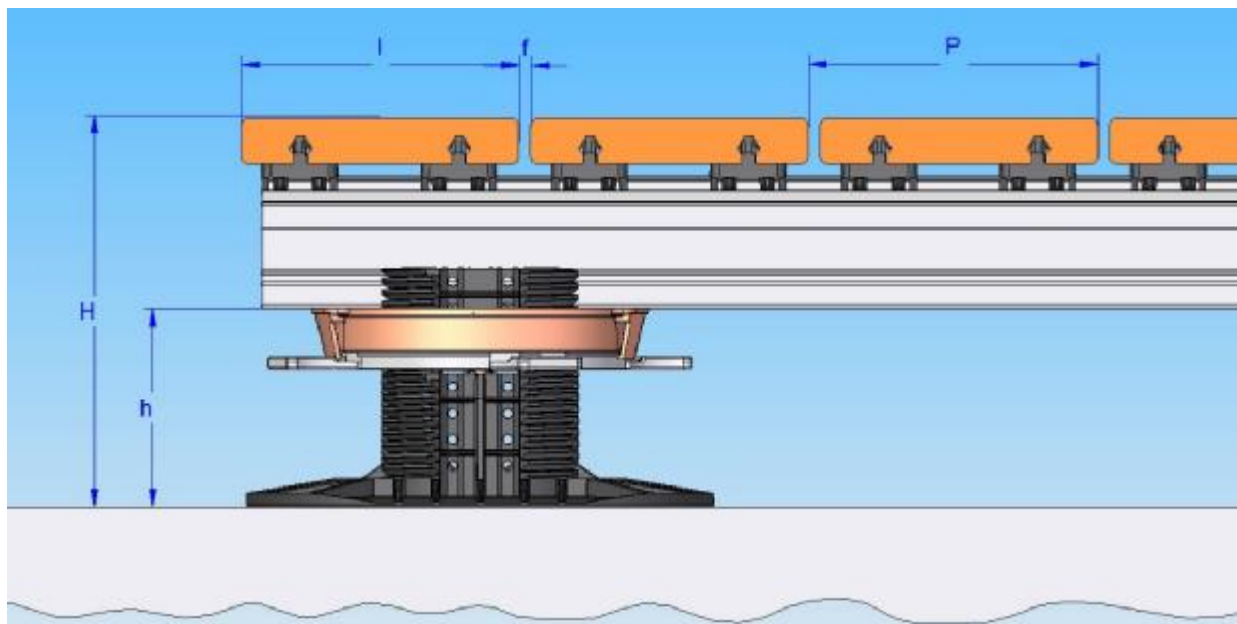
INSTALLATION ON SHEATH: The use of rubber shims for KIT 60 allows the installation without damaging the sheath.

RUBBER DISTANCE: The supports (62,5x430x20 mm), equipped with an adhesive surface for fixing below, have to be placed below the structures at a distance of 60 mm each other (490 mm wheelbase).

SUBSTRUCTURE DECKING ADJUSTABLE HEIGHT

KIT 118-228

Aluminium structure with adjustable height supports for installation of floors in public or residential areas. It allow rainwater drain in all direction and it grants air circulation.



Picture 7: cross section of wooden planks laid solid aluminium substructure KIT 118-228 adjustable height

Table 4

Characteristics KIT 118-228	Ash 90	Ash 120	Teak 135	Ipé 90	Ipé 135
Thickness wood mm	21	21	23	21	23
Width wood mm (l)	91	119	135	91	135
Distance between boards mm (f)	5	5	5	5	5
Pitch width mm (P)	96	124	140	96	140
Variable height substructure mm (h)	35÷190	35÷190	35÷190	35÷190	35÷190
Whole variable Height mm (H)	118÷273	118÷273	118÷275	118÷273	118÷275
Aluminium joist length mm	2400	2356	2380	2400	2380
Distance between joists mm (i)	400	400	300/400	300/450	300/450
N. pedestal for surface pcs/m ²	3	3	4	4	4
Distance of pedestals along joists (mm)	950/1200	950/1200	950/1200	950/1200	950/1200
Resistance substructure distributed load	200 kg/m ² for pedestals disposed at 1200 mm distance along aluminium joists (private and residential)				
Resistance substructure distributed load	500 kg/m ² for pedestals disposed at 950 mm distance along aluminium joists (public and residential)				

Top-Lift® ADJUSTABLE SUPPORTS

Support for reinforced and adjustable aluminium substructure. The adjustment range can be increased mounting up to maximum three couples of extensions. Top Lift® support is composed of a base with a support plate which can be adjust in height using a ring. The support will be delivered totally assembled.

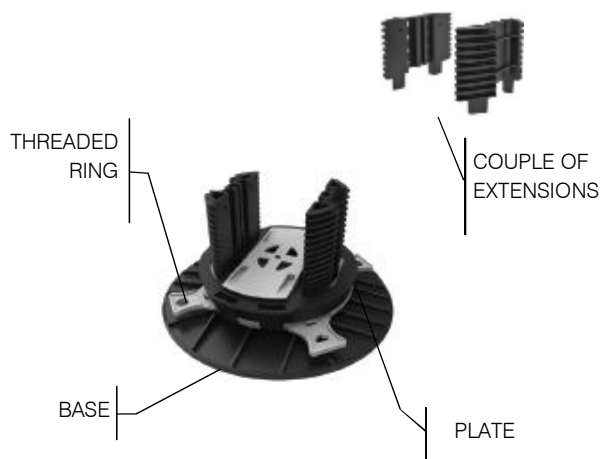


Table 5

Characteristics	Support Top-Lift®
Material	Polypropylene and glass fibres
Diameter of base mm	200
Height min/max adjustable for single support mm	35/55
Height extension mm	45
N. max of pair extensions allowed	3
Width min/max aluminium beams mm	45/62
Height min/max di aluminium beams mm	20/220
Resistance to temperature min/max °C	-30/+60
Resistance to concentrated load kg/support	390
Packaging supports/box	20
Packaging extensions/box	40

CONFIGURATION Top Lift® ON KIT 118-228

Support TopLift



KIT 118 - 138
(support quota: 35-55 mm)

Support TopLift +
1 couple of extensions



KIT 118 - 183
(support quota: 35-100 mm)

Support TopLift +
2 couples of extensions



KIT 118 - 228
(support quota: 35-145 mm)

Support TopLift +
3 couples of extensions



KIT 118 - 273
(support quota: 35-190 mm)

Table 6

Complete height H With adjustable height KIT	Ash 90/120, Ipé 90		Teak 135, Ipé 135	
	H min	H max	H min	H max
Without extensions	118	138	120	140
With 1 pair of extensions mm	118	183	120	185
With 2 pairs of extensions mm	118	228	120	230
With 3 pairs of extensions mm	118	273	120	275

DIRECTIONS FOR LAYING MATERIAL STORAGE BEFORE INSTALLATION

Wood boards and metallic substructure have to be stored:

- In safe areas without the risk of damages caused from other materials or by handling of not authorized people;
- indoor and dry areas, protected from the rain and the snow and without water stagnations;
- in areas with temperature between +15°C (59°F) and +30°C (86°F).

In any case boards must be kept raised off the ground, for example using a pallet (the originally packed pallet, if possible).

In very cold countries (for example extreme northern or southern part of the world), it is necessary to stock boards in a heated storage, at least to 15°C (59°F).

In very warm countries (for example countries in the equatorial area or close to it) it is necessary to stock boards in refrigerated storage, not more than 30°C (86°F).

These directions are valid also for the transportation. Don't store the hardwood floor in places with a direct effect of the sunlight (for instance open containers or warehouses with metal roof).

Open the boxes only when the flooring is being installed and no more than what is needed.

INSTALLATION

Installation on solid floor

Installation on solid floors can be realized using fixed height KITS (KIT 40, 50 or 60) or adjustable height KIT (KIT 118-228 + Top Lift® Supports). It's important to verify that a sufficient slope is granted to hel the water outflow.

In case of KIT 40, verify that the direction of the rails is parallel to the water outflow.

All the elements can be fixed to the ground; it's recommended to carefully value the possibility to fix the rails to the ground to avoid any damage of waterproofing systems.

Installation on not solid floor

Installation on not solid floors can be realized only using adjustable height KIT (KIT 118-228 + Top Lift® support).

This kind of installation requires to consolidate the floor in correspondence with all Top Lift Supports.

It is recommended to put a specific protective cover against proliferation of weeds.

It is recommended to carry out an inspection to verify the state of the laying plan.

If the prescribed requirements are not satisfied, it's compulsory to provide the corrective actions before the installation.

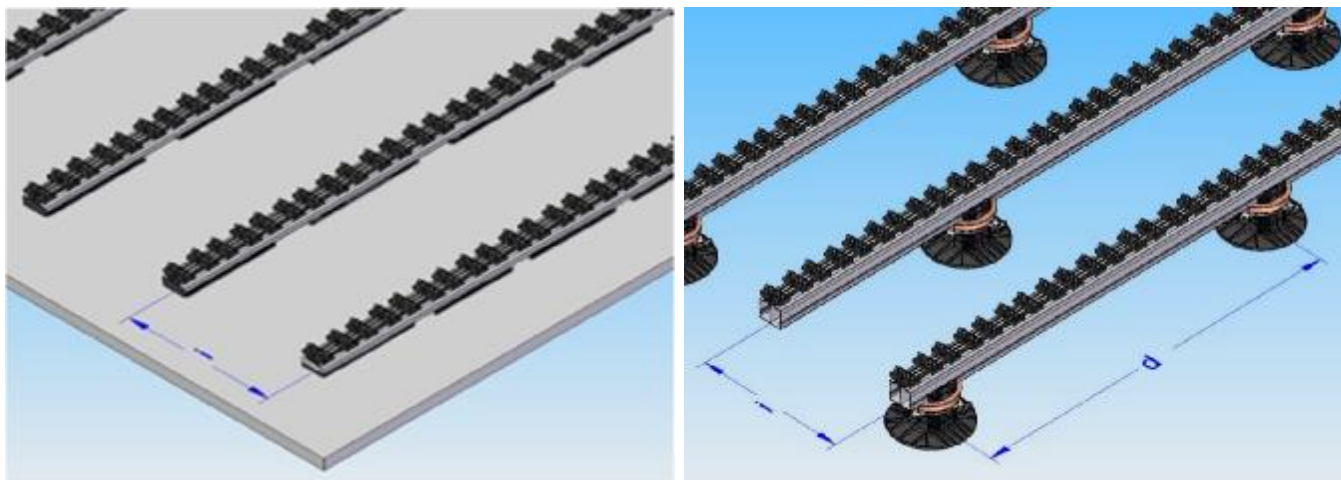
SUBSTRUCTURE DISPOSAL

Fixed height Kits (Kit 40, Kit 50, Kit 60)

- 1) Fix the rubber shims under the rails at a distance of 60 mm each other (wheelbase 490 mm).
- 2) Place the rails with a wheelbase set by boards length so that the heads of the boards will be always in correspondence of a rail. The wheelbase is between 300/450 mm (See table 1-2-3). The rails have to be laid on the ground and they cannot be laid on plots or not continuous supports.

Fixed height Kits (Kit 118-228 + Top Lift Support)

- 1) Place the rails at the same way of the number 5 on a gaming dice at a distance between 950 (public areas) and 1200mm (private areas) along the load –bearing rail. It's advisable to fix the supports on the ground.
- 2) Place the rails with a wheelbase set by board length so that the heads of the boards will be always in correspondence of a rail. The wheelbase is between 300/450 mm (See table 4).
- 3) Use the ring to put the rail in a perfect horizontal position. Where the ground is not planar, sometimes is necessary to shim the Top Lift® Support to level the rails.

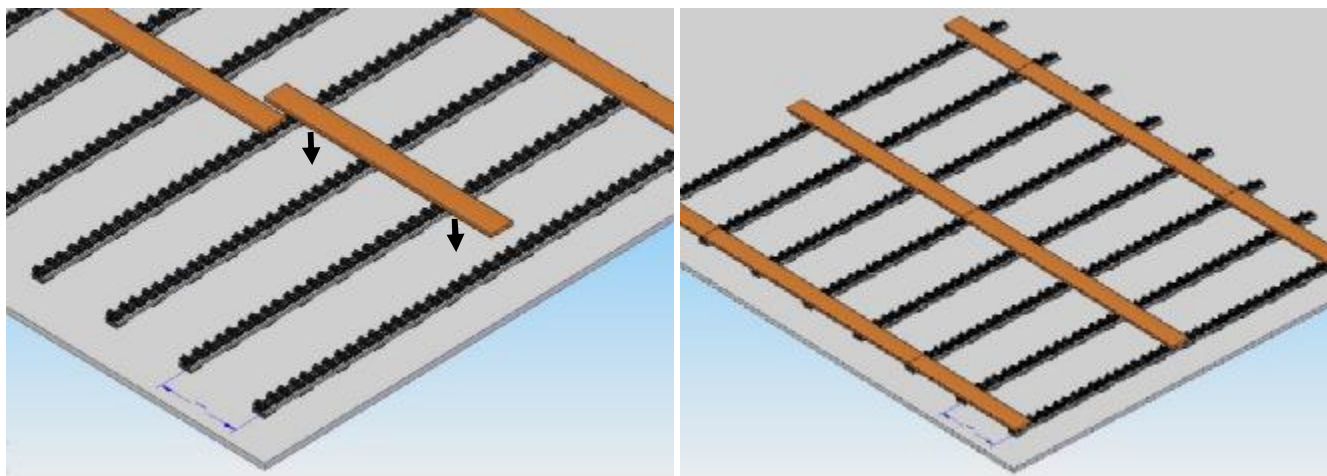


Picture 8: *On the left:* fixed height substructure KIT 60 placed at a distance between 300 and 450 mm; along the longitudinal axis of the rails the distance between rubber shims has to be 60 mm each other (wheelbase 490 mm)
On the right: adjustable height substructure placed at a distance between 300 and 450 mm. The distance (d) of pedestals on aluminium beams must be of 950 mm in public areas, while up to 1200 mm in the case of private areas.

BOARDS FIXING

The installation of decking boards must be realized after disposition of substructure. The jointing to the substructure is done by pressing the planks on clip JuAn®.

It is recommended to fix the heads in correspondence of a rail.

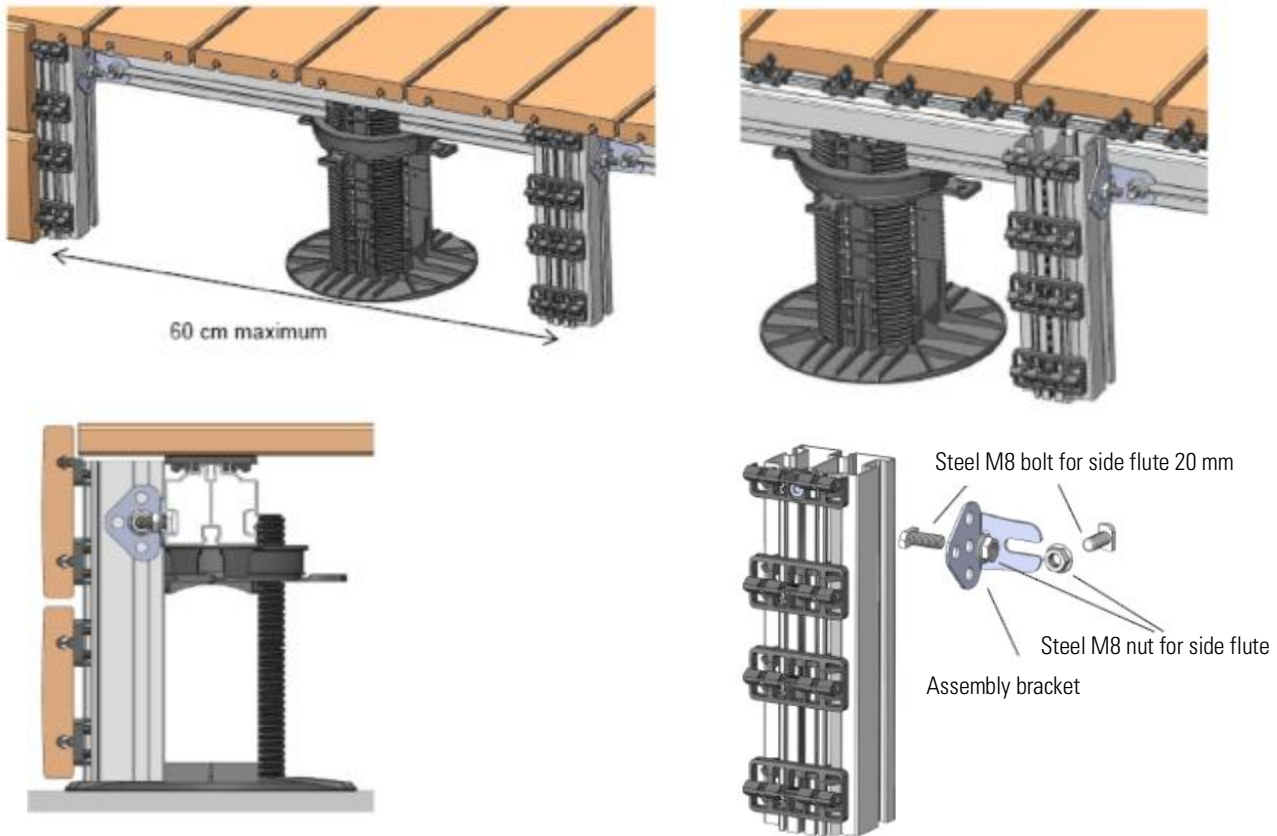


Picture 9 *On the left:* the laying of the lists is done by joining the decking boards to the substructure. It is always recommended to set the heads at a topside.
On the right: the laying of the boards is completed by fit-in gradually one after the other. It is recommended to set the first lists spaced 1-2 m far in order to consolidate the structure during installation.

PERIMETRAL JOISTS FIXING ON ADJUSTABLE HEIGHT KITS

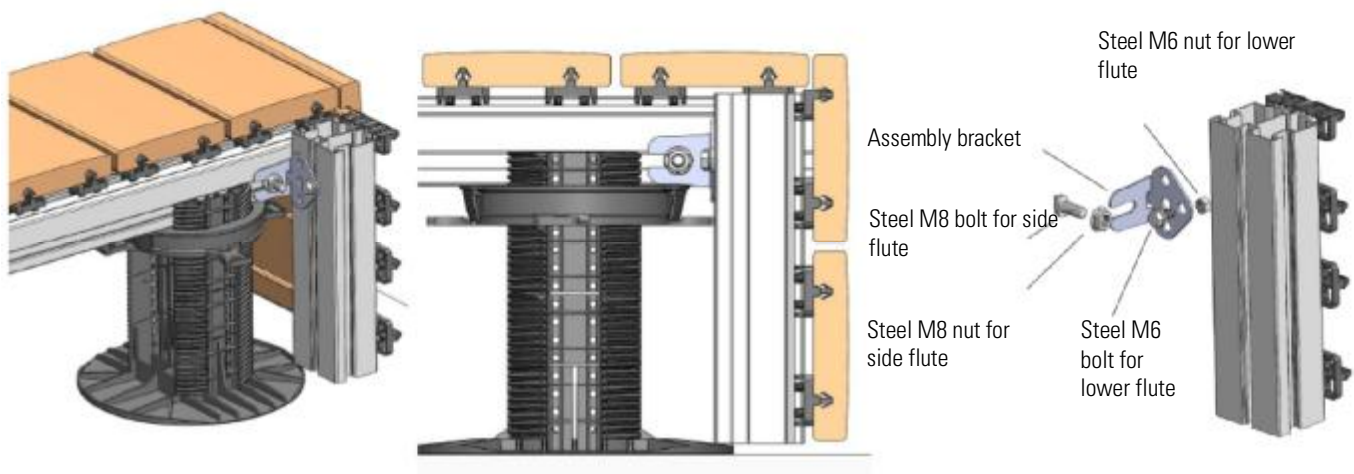
The fixing of the boards to finish the perimeter can be realized using assembly brackets and KIT 118-228 substructure properly cut. The following pictures explain this kind of installation

Finish boards perpendicular to the flooring boards



Picture 10: Grad™ drawings

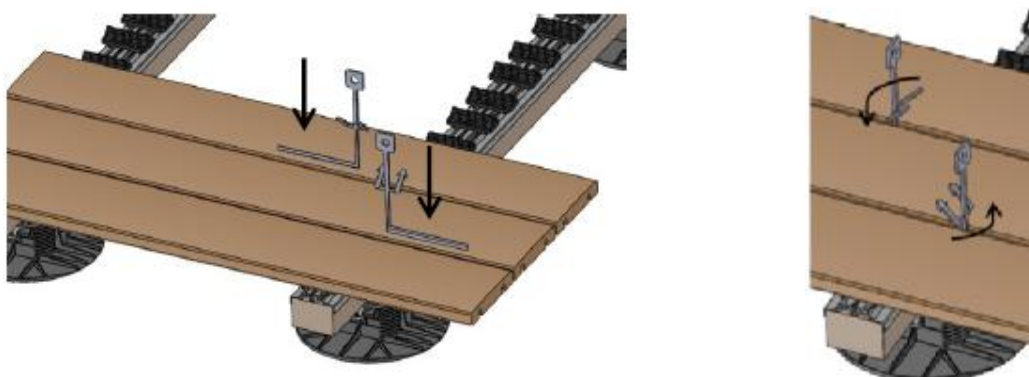
Finish boards parallel to the flooring boards



Picture 11: Grad™ drawing

REMOVING OF DECKING BOARDS

Decking boards can be removed using the special keys. The simultaneous action of the keys allows the lifting of the clip from the aluminium structure and the operations of ordinary maintenance (cleaning and inspection of the zones of outflow) or the replacement of damaged boards.



Picture 12: Left, inserting the keys within apposite shape. Right: key rotation along their axis and placing under the clips (photo Grad TM)

The keys are inserted into the escape and rotated below the latch. Movement must be simultaneous because only in that case clips are removed completely. These can be repositioned by inserting the clip and making pressure on special holes along aluminium joists.



Picture 13: *top left*: the keys are driven simultaneously. Figure 18: *top right*, the action creates the detachment of the clips from the substructure without compromising the integrity of these (photo Grad TM)

The substitution of the lists does not require removal part of floor. The clip JuAn system allows to replace decking boards without the use of visible screws. There is not aesthetic and risk and cracks by using of nails.

FINISHING PRODUCTS AND MAINTENANCE THERMOWOOD SPECIAL OUTDOOR OIL / SPECIAL TEAK OUTDOOR OIL

Outdoor finishing has a protective function. A protection represents a very important factor against ageing caused by UV ray. The periodic nourishment of the wood with ordinary maintenance product allows to renew the protective function of anti-UV filter. We recommend to apply the finish at least twice a year and to intensify the maintenance if the wood is continuously subjected to direct sunlight.

In absence of a periodical maintenance, wood will change its aesthetic appearance, inevitably turning towards a gray colour and its surface will be impoverished, so as to form, more easily, fibres lifts and cracks in the wood itself.

Outnature version provides the application of the first protective layers during the production and another layer, having an anti-slip function too, immediately after the installation with products supplied with the flooring.

In **unfinished version**, a finishing in place it's necessary, consisting of the minimum application of two layers of oil.

GENERAL PRODUCT DESCRIPTION

Special oil for outdoor wood floorings, water-repellent and highly penetrant. It protects wood from impurity and moisture. Outnature oil is characterized by a very high yield, it's easy to apply and it penetrates deeply reducing retire and swelling wood problems.

Special micronized pigments ensure a strong resistance against bad weather and UV rays, as well as an excellent colour stability. It doesn't contain aromatic solvents.

Special Outdoor Oil is proposed in Thermo-treated Ash version and in Teak and Ipè version.

PRODUCT	Oil for outdoor wood flooring
DANGER INDICATIONS	Flammable liquid and vapor
APPLICATION METHOD	Brush, roller, brush, rag
SHAPE	Liquid, different shades
FLASH POINT (DIN 53213)	>62 °C
DILUTION	Ready to use
PROCESSING AND SUPPORT TEMPERATURE	At least +5°C e not higher than +30°C and/or relative humidity >80%
DRYING TIME	12 hours in conditions of 23° C / 50% RH
PACKAGING	0,75 LT ; 2,5 LT
AVERAGE YELD OF PRODUCT ON ONE COAT OF APPLICATION	15 m ² / LT. Shape, specie and moisture of wood can influence the average consumption
NUMBER OF COATS	2
STORAGE	To preserve between 10° and 30° in a dry and well ventilated area. To protect against heat and direct sunlight

FINISHING WOOD PREPARATION

The flooring has to be dry, clean and without release agents (grease, wax, silicon, resin...) and without wood powder.

Unfinished boards: to have a higher durability we recommend sand wood surface with 80 grit abrasive paper in fibre direction, remove accurately all processing residue

Outnature boards: no sanding should be performed.

Outnature oil application on grey and strongly aged surfaces requires a preliminary cleaning with **Anti-greying** (see dedicated paragraph). Wood, once accurately restored, is ready to be finished if equilibrium moisture reaches a value <15%.

Outdoor oil application on surface finished with varnishes or water-based products requires the removal of the existing finishing with a specific product through sanding. Perform the operation taking care to remove all the previously finished surface.

APPLICATION

Open the package of outdoor oil and mix the product thoroughly before applying.

For a more effective protection of the wood, it is preferable to apply the product on each side before laying.

Outdoor oil is a product that can be applied using a brush or rag. Do not spray the product.

It is a high yield product, it is applied by spreading a uniform veil following the grain of the wood. Any excess of product can be removed with a cloth.

The oil drying takes 12 hours in normal weather conditions (23° C, 50% moisture). Low temperatures and / or periods of high humidity increase oil drying times. Particularly deteriorated surfaces can absorb a higher quantity of oil than the declared average value.

Unfinished boards: once applied a coat of Outdoor oil and after drying time, apply a second coat of the product in the same way.

Outnature boards: just apply a hand of Outdoor oil.

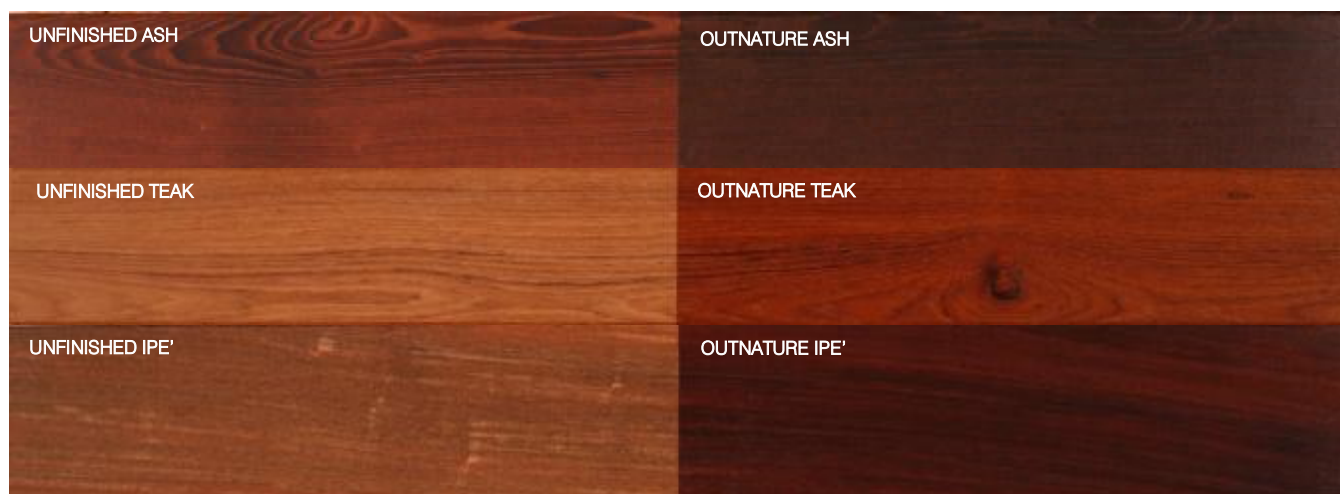
PERIODIC MAINTENANCE

The duration of protection of the finish depends on many factors, in particular from exposure to bad weather and insolation, from mechanical stress. It is advisable to carry out two maintenance operations a year, placed, for example, at the end of winter and at the end of summer. Where conditions of particular stress are created due to exposure, it is necessary to intensify periodic maintenance operations.

Remove dust and dirt from surfaces; pass scotch-brite green pad along vein by hand or with the help of a single brush; remove residues and apply a thin coat of Outdoor Oil along the wood grain; after the drying time (12 hours), apply a second coat of the product in the same way.

Clean all the tools with a thinner for enamels/synthetic paints to be applied with a brush. The product must be stored out of reach of children. Avoid contact with eyes and skin. Read the label before use. Keep away from heat, hot surfaces, sparks, open flames or other ignition sources. Not smoking. Wash thoroughly with water in case of contact and consult a doctor. Use the product only in ventilated areas. The product contains 3-iodo-2-propinylbutyl carbamate. May cause allergic reactions. Wash impregnated clothes or rags immediately or store them in a tightly closed environment.

WOOD ASPECT



POWER-GEL ANTI-GREYING FOR WOOD

GENERAL PRODUCT DESCRIPTION

It removes grey from each wood specie or aged handwork exposed outdoor.

It restores the original aspect of wood making the surface ready for the new finishing treatment. The product acts exclusively on the greyed wood, so if there are traces of an old varnish, it has to be mechanically (hard brushing or sanding) or chemically (hard paint stripper product) Removes grey from the boards surface in the event that it should take on an aged appearance due to failure

PRODUCT	Bluish gel/ liquid
APPLICATION METHOD	Brush, paint-brush, paint roller
TIME OF ACTION OF THE PRODUCT ON THE WOOD	20 min.
DILUTION	Ready to use
PROCESSING AND SUPPORT TEMPERATURE	At least +5°C
TOOLS	After the use, immediatly clean with water
PACKAGE	1 LT ; 2,5 LT
AVERAGE PRODUCT YELD	5 m ² / LT
NUMBER OF HANDS	1
STORAGE	To preserve in a cool place, not exposed to frost. Do not pour into metal containers
DURATION	Minimum 3 years in originally sealed packages

COMPOSITION

Biodegradable oxalic acid-based product

PRODUCT USE

Apply the product on the wood surface (pre-wet with water) until it forms an even layer, then leave it for 10-15 minutes, maintaining wet the surface (periodically wet the surface with water using a nebulizer).

The anti-greying product acts on the grey parts of the wood, defined without a few microns of the surface. Cover plants or delicate surfaces which are not to be treated and wash them if case of contact with the product.

Brush the surface with a nylon or sorghum bristle brush (do not use metal brushes). Operations can be carried out with a rotary brush machine with a green scotch-brite pad (only for flooring with smooth surfaces) or with a floor washing machine (for floorings with brushed surfaces as Ash).

The brushing of the product must be strictly carried out on wet surfaces. The hottest hours of the day, especially in summer, can cause the product to dry early. Therefore, to obtain a better result, it is advisable to wet the surface before brushing if the surface is dry after a few minutes from the application.

Rinse with water. This serves to eliminate the wooden clumps formed after brushing. Use a floor washing machine with suction or a high pressure pump (max pressure 60 bar). The amplitude of the water jet and its proximity to the surface of the wood are very important. The water jet should be widespread and distant from the surface so that it does not nick/hollow the wood. Some traces of grey may still be visible after treatment. This is due to uneven application of the product on some areas of the flooring. Repeat operations if necessary. Wood is dry and suitable for finishing after 2-3 days after cleaning (moisture content <15%)

DECKING CLEANER

Detergent for periodical cleaning of wood floorings oil-finished. The product

PRODUCT	Liquid formulation to be diluted in water
APPLICATION METHOD	Mop, rag
pH	neutral
DILUTION	In water; ratio of the product mixture 1: 100
PROCESSING AND SUPPORT TEMPERATURE	Do not apply in case of temperatures below + 5 ° C and above + 30 ° C and / or relative humidity > 80%
PACKAGE	1 LT ; 2,5 LT
AVERAGE PRODUCT RETURNS	500 m ² / LT
NUMBER OF HANDS	1
STORAGE	Store in a place protected from moisture, direct exposure to sunlight, frost and high temperatures (above 30°C)
DURATION	Minimum 3 years in originally sealed packages

Mix accurately the product before use. The product should be used by adding Outdoor Cleaner in water (8-10 ml of product per liter of water). Apply the product evenly with a rag and let it dry. Do not rinse with water as this would remove the protective film. To remove dirt in depth, use a brush with soft plastic bristles. Avoid direct contact with plants. For a deep cleaning, the use of Anti-gray is recommended.

IMPORTANT INFORMATION ABOUT OUTDOOR: WOOD AS A LIVING MATERIAL

Wood is a "living" material that, due to its nature, is subject to changes due to environmental factors such as exposure, temperature, rain and humidity as well as daily use. For example, it is necessary to know that:

BIOLOGICAL DURABILITY

Heat-treated Ash, Teak and Ipé wood floors have the best resistance to biological wood alterations. These floors in solid wood do not require additional treatments to improve resistance to wood pathogens.

RAISED STRUCTURE

Outdoor floors are raised structures specifically designed to ensure long-life of the wood outdoors. The construction of a raised floor allows water to flow away and promotes ventilation of the structure, preventing the formation of permanent humid areas. Attaching the boards and strips directly to the ground can cause a permanent accumulation of humidity, leading to conditions for the development of the primary wood pathogens. Therefore, we recommend not attaching the boards and strips directly to the ground and to always use raised structures.

COLOUR

The colour of the wood floor depends not only on the wood fibre but also on certain substances, called extracts, that are naturally present in the wood. These substances provide elevated and natural biological durability to woods like Teak and Ipé. Heat treated Ash has a dark brown colour due to the treatment cycle used on the raw material. Due to the high extract content, tropical woods are particularly subject to colour alterations due to heavy and rapid oxidation; this can lead to colour differences and changes even on elements that were originally similar. The oxidation phenomenon can highlight the formation of silica that is naturally present in the wood structure.

AGEING

Long exposure of the floor to the sun's rays leads to a colour change, giving the wood a uniform grey colour. This is a natural and inevitable phenomenon on woods used outdoors. This comes from the prolonged action of UV rays which, alternating with the washing out action of the rain, determine the quickness of the phenomenon. This occurs more with stronger sun rays, namely during the summer and with southern exposure. Wood ageing is a phenomenon that only affects the surface of the wood and does not impact its mechanical and structural characteristics.

CLIMATE CONDITIONS

Wood is naturally subject to dimensional changes depending upon the humidity and temperature. It is natural to have size variations from the absorption or loss of humidity in the wood due to the climate in the location in which the floor is installed. For this reason, outdoor floors must always be built with a space between the boards. Extreme conditions such as drought or high humidity can cause very high tension inside the wood. In serious cases this can lead to the appearance of cracks in some boards (due to sliding between the growth rings resulting from exceeding the elastic compression limit).

FRACTURES

The nature of the wood along with the typical flamed veining from tangential cutting, leads to possible slight fractures near the pith. This phenomenon, which is a characteristic of wood, can be more significant when the floor is exposed to violent and sudden climate changes.

FINISH

The finish on outdoor floors is protective in nature. The boards can be supplied in the version finished or unfinished wood. For unfinished wood version a finish treatment is recommended after installing the floor. Tropical woods are generally treated with oils for outdoor floors. Finish products that are oil-based and rich in iron oxides greatly darken ash. For this reason, a specific oil-based finish for heat treated wood is recommended to better protect and enhance the grain of Ash.

MAINTENANCE

Protection is a very important and influential factor against ageing from UV rays. The periodic nourishment of wood with routine maintenance products, renews the protective action of the UV filters. We recommend it be done at least twice a year and to intensify the maintenance if the flooring is continuously subjected to atmospheric agents. Without periodic maintenance, the appearance of the wood will change, inevitably changing to grey.

MECHANICAL CHARACTERISTICS

All wood species used for outdoor floors have mechanical characteristics that fully ensure the performance required for that use. Despite this, stress due to impacts or falling objects as well as concentrated high loads (high heeled shoes, ladders, etc.) can cause surface lacerations. The wood does not have uniform characteristics like synthetic materials. This means that two floors made of the same type of wood can never look identical. For the same reason, a sample made up of a few boards can only give an idea of the appearance of the entire floor but can never demonstrate the final result in all details.

The phenomenon described above are part of the nature of wood floors and cannot be considered defects.

USE AND MAINTENANCE CONDITIONS

The instructions for correct use and maintenance of the floor are available on the website, www.listonegiordano.com, in the section containing the documentation. We recommend checking it when selecting the product.

The instructions given in the sheet derive from the research and direct experience of the Company and are valid in general, given the impossibility to foresee all the environmental and application variables. Non contractual document. Margaritelli S.p.A. reserves the right to change the features and range of products mentioned in this edition at any time and without prior notice.

DK 01 - March 2019