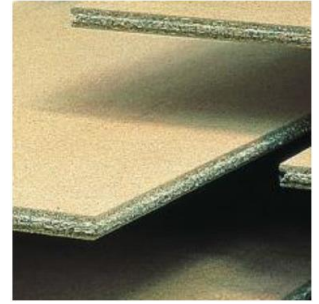


# Tongues and grooves (T&G) flooring boards

Particleboard machined 4 edges tongue and groove, calibrated and sanded (unsanded for Kronoliss). Several qualities: P2, P3, P4, P5, P6 and Euroclasse fire retardant B-s2,d0 on P2, P3 or P5 board base.



## Basic technical definitions

The national and international build standards in force in each country should be used as a reference.

(E.g. Eurocode 5 - EN 1995-1-1)

T&G Boards construction products are divided according to their destined use in order to easier design of wood constructions regarding the basic European standard EN 1995-1-1 or some national standards.

Technical definitions and basic terms related to board classification according to EN 13986 is as follows:

- Dry condition

Conditions corresponding with service class 1 according to EN 1995-1-1 are characterized by a moisture content in structural materials, which corresponds to the temperature of 20 °C and relative humidity of the ambient air of 65% few weeks a year at the most. Most coniferous wood has the average moisture content not exceeding 12%.

- Humid condition

Conditions corresponding with service class 2 according to EN 1995-1-1 are characterized by a moisture content in structural materials, which

corresponds to the temperature of 20 °C and relative humidity of the ambient air exceeding 85% few weeks a year at the most. Most coniferous wood has the average moisture content not exceeding 20%.

- External condition

Conditions corresponding with service class 3 according to EN 1995-1-1 are characterized by climatic conditions leading to higher moisture content than the second service class.

- Load-bearing (structural) use

Using the board under load as part of the building or other construction.

- Structural floor decking

Floor set of wood-based boards placed on joists and overlapping its span. The boards under load freely deflect between the joists.

- Structural wall sheathing

Wood-based boards capable of providing mechanical strength for the wall construction.

- Structural roof decking

A set of wood-based boards placed on the rafters and overlapping their span. The boards under load deflect freely between the rafters.

## Application Area

All types of residential or commercial buildings: offices, shops, hotels, shopping centers, industrial premises, social or educational centers, etc.

Flooring in dry condition		Flooring in humid condition		Cover and sealing support	
All floors installation in a dry environment		Bathroom, kitchen, floors on crawl space, etc.		All types of ventilated roof, shingles, etc.	
Public access buildings	Other buildings	Public access buildings	Other buildings	Public access buildings	Other buildings
TG P5 B-s2,d0	TG P4 or P5 or P6	TG P5 B-s2,d0	TG P5	TG P5 B-s2,d0	TG P4 or P5 or P6

Board type	Bearing structures	Indoor environment
T&G P2	<b>NO!</b> decorative layout slab only	Dry
T&G P3	<b>NO!</b> decorative layout slab only	Humid
T&G P4	Yes	Dry
T&G P5 and Kronoliss	Yes	Humid
T&G P6	Yes	Dry

## Characteristics



Our slabs are made on the basis of our particleboards: to know the other mechanical and physical characteristics of the products, refer to the technical data sheets of the corresponding qualities.

There are two standard formats: 205 x 91 and 205 x 60 in useful format (205.7 x 91.7 and 205.7 x 60.7 in overall format). Other formats are available on request.

Characteristics	Unit	Values
Tolerance on nominal dimensions	mm	± 5,0
Tolerance on the thickness	mm	± 0,3
Squareness	mm/m	≤ 2,0
Flatness	mm/m	≤ 1,5
Moisture content (ex works)	%	5 to 13
Punching resistance (load necessary for a penetration of 1 mm of a metal rod of diameter 10 mm)	daN	160 for T&G P4 thickness range 19 and 22 mm
		190 for T&G P4 thickness ≥ 25 mm
		190 for T&G P5

## Transport and storage

Proper transport and handling, stacking and storage is essential for trouble-free use of wood-based boards.

Properties of the boards are not significantly different from the solid wood at which the moisture content changes with temperature and relative humidity environment of the surrounding environment. Dimensional changes (length, width and thickness) are dependent on changes in the moisture content. Therefore, it is important that the moisture of boards during storage is close to the balanced moisture of boards corresponding with environment in which they will be subsequently assembled and used. Improper storage and wrong handling can lead to the devaluation of the boards.

### • Packaging - Stacking

The boards come in packages, fastened with tape. Every package is fitted with inserts fixed to the boards with a plastic tape. Board packages must always be stacked horizontally on a flat surface.

### • Transport

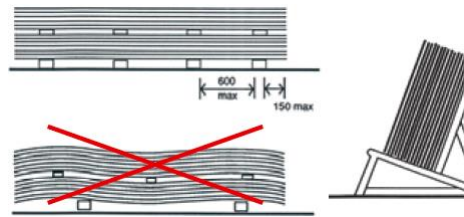
During transport the boards must be protected from direct exposure to water. The edges must be especially protected against rain or accidental soaking. The panels are slippery and should be fastened adequately to avoid movement during transportation. The boards must be appropriately protected against damage with fastening ropes, belts or others. This particularly applies to tongue-and-groove panels.

### • Manipulation

When handling the board package it is recommended to use forklift truck rather than crane. During any handling of boards it is necessary to avoid damage to surfaces and especially edges with forks of the handling device or with the supporting ropes.

### • Storage and stacking during reloading

The boards must be stored in closed, dry and well ventilated buildings to avoid excessive moisture, which can cause warping or buckling of the boards. Store the boards constantly lying down on a level and rigid base, this will prevent bending and twisting. Store the boards so the entire surface lays on each other with flush-fitting edges. The underlying spacers must be oriented in the direction of shorter edges of the boards (minor axis) with a maximum spacing of 600 mm. The length of underlying spacers must match the width of the boards. Insert a spacer after each twentieth to twenty-fifth board for perfect ventilation. The individual interlacing spacers must be placed exactly above each other. The upper board of the stack must be covered.



### • Short period storage on construction site

In case of temporary external storage the boards must be stored on elevated pallets or on tall bases to avoid contact with the ground, water or vegetation and at the same time it should be covered with waterproof but air permeable canvas allowing diffuse ventilation and air circulation under the boards and on their sides. The external storage of boards is recommended only for a necessary short period. It is not recommended to store the boards in a vertical position. This is possible only for a very short period of time (e.g. for conditioning the boards prior to installation).

In such case the boards should not be leaning against the walls. The best way is to create a base (rack) with general support at the bottom and back from the panel of a minimum thickness of 18 mm (image 2). If the boards were exposed to sunlight, the ultraviolet radiation could cause colour changes. This also applies to panels, which were installed as part of decoration. Surface colour changes caused by the solar radiation do not affect the technical properties of boards.

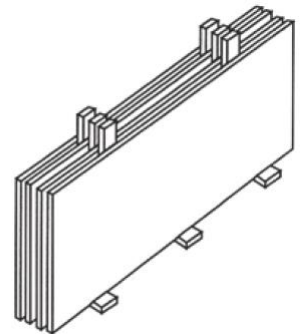
## Conditioning

So called conditioning of boards should precede construction assembly to reduce dimensional changes. Conditioning of boards serves to balance the moisture with its environment for at least 48 hours in the thermal-humidity condition which corresponds to those of their future use.

Boards can be conditioned by loose laying (for example on the floor) on the underlying battens or by alignment to each other (vertically/horizontally) with crossbars so the air can constantly circulate between them. Image 3 shows a suitable way of conditioning with battens.

Boards left in the protective packaging from the manufacturer cannot be adequately conditioned!

Optimal conditioning time varies depending on environmental conditions. The minimum required time of 48 hours conditioning may not be sufficient, recommended conditioning time is 1 week, in specific cases may be even longer.



## Fixing boards

Boards can be mechanically attached using nails, wood screws or staples. Attaching is the same as for solid wood. Corrosion resistant fasteners should be used for load-bearing structures.

For statically stressed wooden structures there must always be taken into account design rules for boards fixing specified in the relevant design standards (valid EN 1995-1-1). The rules should be included in the project documentation.

The nails can be smooth or twisted. The nails must be a length at least 3 times the panel thickness and the screws at least 2 times with a minimum of 40 mm for the screws and 50 mm for the nails.

In the case of fixing by nailing or stapling, the maximum spacing of the tips is 150 mm on the peripheral supports and 300 mm in the common part and at a minimum distance of 8 mm from the banks, 10 mm being recommended. The nailing is completed by a screwing at the 4 corners of the panel and at mid-length.

In the case of fastening by screwing, the same spacing is respected.

## Installing

Comply with the requirements of EN 1995-1-1. The T&G must rest on at least three supports and be installed with staggered joints (stone cutting). In all cases the shores of panels parallel to the supports (small sides) must rest on a continuous support. The covering on the support must be at least 20 mm. The board type is dependent upon the required extent of load, type of load and on the class of board use (service class 1 or 2). Board thickness can be determined by static calculation or more easily from the tables depending on the size of load and from support distances.

Basic installation requirements:

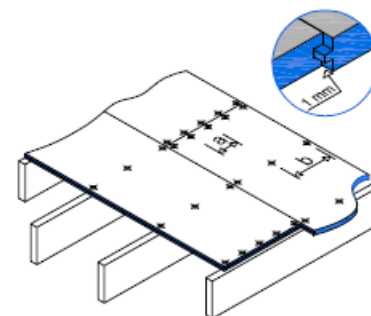
- All supports (joists, noggings, corner supports) must be leveled to a single horizontal level.
- Increasing local moisture in boards from other materials the boards may be in touch with must be eliminated.
- All wooden supporting elements must be dry or dried out to moisture content similar to humidity conditions in which the structure will be used.
- Axial distance of supports should be selected in relation to the board dimensions to reduce potential wastage.
- T&G boards must always be laid so that a higher strength of boards (main axis, the

longitudinal direction boards) is in the direction perpendicular to the joists.

- Along the perimeter of the walls and other vertical pervading constructions dilatation gap of at least 15 mm must be maintained for potential movement of boards.
- Straight edge boards can be used. Using of tongue and groove boards is more suitable.
- Boards with a straight edge laid on a supporting beam with expansion gaps 2-3 mm apart (depending on the board size). It is necessary to support all board edges.
- Tongue and groove boards must be laid so that all shorter edges are supported by joist. T+G joints shall be glued for higher rigidity (e.g.

polyurethane). It is necessary to support all cut edges.

- The short edge joints of panels should be staggered.



## Maximum permissible center distances (in cm) depending on loads

The distances recommended in the tables below have been established on the basis of the following assumptions: Maximum deflection of 1/400° of the span, under uniformly distributed loads, under concentrated loads of 200 kg, safety factor ≥ 5, assembled boards, laid classical brick bond pattern and supported by three supports at least.

### T&G P4 – Service Class 1

Permanent Loads (daN/m <sup>2</sup> )	Theoretical center distances (cm)				
	T&G thickness (mm)				
	19	22	25	30	38
150	46	50	57	65	76
200	42	47	53	61	71
250	40	44	50	57	67
300	37	42	47	54	63
400	34	38	43	50	58
450	33	37	42	48	56
500	32	35	40	46	55

Permanent Loads (daN/m <sup>2</sup> )	Practical Center Distance (cm) length used 2050 mm				
	T&G thickness (mm)				
	19	22	25	30	38
150	41,0	41,0	51,3	51,3	68,3
200	41,0	41,0	51,3	51,3	68,3
250	34,2	41,0	41,0	51,3	51,3
300	34,2	41,0	41,0	51,3	51,3
400	34,2	34,2	41,0	41,0	51,3
450	29,3	34,2	41,0	41,0	51,3
500	29,3	34,2	34,2	41,0	51,3

### T&G P5 and Kronoliss® – Service Class 2

Permanent Loads (daN/m <sup>2</sup> )	Theoretical center distances (cm)				
	T&G thickness (mm)				
	19	22	25	30	38
150	45	49	55	63	76
200	41	46	51	59	70
250	39	43	48	55	66
300	37	41	46	52	63
400	33	37	42	48	58
450	32	36	41	47	56
500	31	35	39	45	55

Permanent Loads (daN/m <sup>2</sup> )	Practical Center Distance (cm) length used 2050 mm				
	T&G thickness (mm)				
	19	22	25	30	38
150	41,0	41,0	51,3	51,3	68,3
200	41,0	41,0	51,3	51,3	68,3
250	34,2	41,0	41,0	51,3	51,3
300	34,2	34,2	41,0	51,3	51,3
400	29,3	34,2	41,0	41,0	51,3
450	29,3	34,2	34,2	41,0	51,3
500	29,3	34,2	34,2	41,0	51,3

### T&G P6 – Service Class 1

Permanent Loads (daN/m <sup>2</sup> )	Theoretical center distances (cm)	
	T&G thickness (mm)	
	38	
300	76	
350	73	
400	70	
450	68	
500	65	

These charts and this data sheet are provided for information only. They do not engage the responsibility of Kronospan sas. They can be modified without notice according to the evolution of the regulation, the methods of calculation and the materials.