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FREQUENTLY ASKED QUESTIONS

ABOUT OSB

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CHAPTERS

SECTION A: DEFINITION / CLASSIFICATION / PROPERTIES

1. Q: WHAT IS OSB?

A: OSB is an engineered plane and rigid wood panel made of wood strands of selected quality with controlled cross orientation, bound with a synthetic resin under high temperature and pressure conditions. Depending on their technical class (type) and intended use, the boards can be used in dry or humid condition.

2. Q: HOW MANY TYPES OF OSB EXIST AND WHAT IS THE INTENDED USE FOR EACH?

A: According to EN 300, there are 4 types of OSB, known as technical classes:

- OSB/1 ⇢ general purpose non load-bearing boards for use in dry conditions (service class 1)
- OSB/2 ⇢ load-bearing boards for use in dry conditions (service class 1)
- OSB/3 ⇢ load-bearing boards for use in humid conditions (service classes 1 & 2)
- OSB/4 ⇢ heavy-duty load-bearing boards for use in humid conditions (service classes 1 & 2)

Among these, OSB/3 is currently the most used product in Europe. The standard OSB boards have un-sanded faces and sharp edges, but smooth/sanded faces and milled edges (2 or 4-sides „tongue and groove“ T&G profiles) are also possible to manufacture.

3. Q: WHICH ARE THE MAIN FEATURES OF OSB?

A: OSB is a plane and sturdy board, with remarkable mechanical properties and dimensional stability. Its main function is the structural use (structural floor, roof and wall sheathing), but also incorporates the function of a vapor barrier and of an airtight layer when used in the exterior components of wood frame houses.

SECTION B: STANDARDS & SYMBOLS

4. Q: WHICH ARE THE MOST IMPORTANT STANDARDS FOR OSB AND TIMBER CONSTRUCTION?

A: Among the many standards referring to wood products and timber, the most important are:

- EN 13986:2004: Wood-based panels for use in constructions ⇢ Characteristics, evaluation of conformity and marking
- EN 300 (product standard for OSB): Definition, classification and requirements
- EN 12369-1: Wood-based panels ⇢ Characteristic values for structural design; Part 1: OSB, particleboards and fibreboads
- EN 1995-1 (Eurocode 5): Design of timber structures ⇢ Part 1-1: General rules and rules for buildings
- EN 1995-2 (Eurocode 5): Structural fire design of timber structures
- EN 335 (wood preservation)
- EN 120: Determination of formaldehyde content (perforator method)
- EN 717-1: Determination of formaldehyde release (chamber method)
- EN 13501-1/2: Reaction to fire ⇢ Part 1: classification of building materials according to Euro-classes; Part 2: classification of building components (roofs, walls, floors)
- EN 12871-1: Wood-based panels ⇢ Performance specifications and requirements for load-bearing boards for use in floors, walls and roofs

5. Q: WHAT IS THE MEANING OF THE SYMBOLS MET IN STANDARDS (TABLES)?

A: The most important characteristics and associated symbols related to OSB are:

a) Symbols:

- f ⇢ strength
- E ⇢ modulus of elasticity (stiffness)
- G ⇢ modulus of rigidity
- k ⇢ retention in strength (kmod) or stiffness (kdef) after a period of time rel. to initial values
- t ⇢ thickness
- ρ ⇢ density
- // or o ⇢ in the direction of the major axis of OSB
- ⊥ or 90 ⇢ in the direction of the minor axis of OSB

b) Subscripts:

- m ⇢ bending
- t ⇢ tension
- c ⇢ compression
- v ⇢ panel shear
- r ⇢ planar shear
- nom ⇢ nominal
- def ⇢deflection

6. Q: WHAT MEANS MAJOR AND MINOR AXIS OF OSB?

A: Unlike particleboards and fibreboards (which show uniform distribution of stress all-over the panel), OSB exhibits different bending and stiffness values on the two dimensions. Typically, they are 2-2,5 times higher on length compared to width. In this respect:

- Major axis = the dimension in the plane of the board in which bending properties have the higher value
- Minor axis = the dimension in the plane of the board at right angles to the major axis

7. Q: WHAT ARE THE TECHNICAL CLASSES OF OSB?

A: Technical classes are the terminology used to describe the different types of OSB boards, according to their intended end use (load & climate conditions). There are 4 technical classes: OSB/1, OSB/2, OSB/3 and OSB/4.

8. Q: WHAT IS THE DIFFERENCE BETWEEN SERVICE CLASS AND USAGE CLASS?

A: By **service classes** there are defined 3 different moisture conditions of the environment. For OSB, they describe the moisture conditions of the environment where the boards are intended to be installed. The standard EN 1995-1-1 defines the 3 service classes, as follows:

- **Service class 1** (**dry conditions**, RH ≤ 65%) ⇢ characterized by a moisture content in the material corresponding to a temperature of 200C and a relative humidity of the surrounding air only exceeding 65% for a few weeks in a year
- **Service class 2** (**humid conditions**, 65 ‹ RH ≤ 85%) ⇢ characterized by a moisture content in the material corresponding to a temperature of 200C and a relative humidity of the surrounding air only exceeding 85% for a few weeks in a year
- **Service class 3** (**external conditions**, RH › 85%) ⇢ climatic conditions leading to a higher moisture content than in service class 2

The **usage classes** describe the end-use situations of the wood and wood-based panels, related to climate. The standard EN 335-1 defines 5 usage classes. Among them, applicable to OSB are:

- **Usage class 1** ⇢ describes the situations where the wood and wood-based products are used under roof, completely protected from weather and not exposed to wetting.
- **Usage class 2** ⇢ describes the situations where the wood and wood-based products are used under roof, completely protected from weather and where the high surrounding moisture can lead to limited time-wise wetting.

9. Q: WHAT IS THE DIFFERENCE BETWEEN THE REQUIREMENT VALUES AND THE DESIGN VALUES OF OSB?

A: The **requirement values** indicate the quality of the boards as delivered from production. They represent the reference values for the factory production control (FPC), in other words the minimal values the boards must posses in order to pass the quality testing in the factory. The requirement values of OSB are given in the product standard **EN 300**. The requirement values of the boards are not the values to be used in the structural design of structures!
The **design values** are the values used for the static design of the structural elements (floors, walls and roofs) made of OSB decking/sheathing spanning over supports (beams, studs, rafters). Often they are referred also **as the performance values used in the static design**. They include the effects of different loads upon the structure (self-weight, storage-weight, wind, snow) and takes into account the importance of the building (people occupancy) and the load duration.
EN 12369-1 is the standard that regulates the static design of structural elements with OSB, for board thickness ≤ 25 mm. For thicknesses › 25mm, the manufacturer must declare its values according to test procedures described by EN 789 and EN 1058.

SECTION C: RAW MATERIALS & PRODUCTION

10. Q: WHAT KIND OF WOOD IS USED FOR OSB PRODUCTION?

A: In the OSB production is used only virgin debarked coniferous wood (mainly spruce, pine, fir) and deciduous wood (beech, birch, poplar), without defects (knots).

11. Q: WHY SOFTWOOD IS PREFERRED TO HARDWOOD IN OSB PRODUCTION?

A: The wood species commonly used in the OSB production are:

a. Softwood (coniferous wood): spruce, pine, fir

b. Hardwood (deciduous wood): beech, birch, alder, ash

The reason why softwood is preferred to hardwood is because softwood gives generally a lighter appearance to the board surface, and because it's swelling rate in lower than hardwood's. Resulting from different growth pattern, softwood is lighter in density than hardwood, so its strength and stiffness are lower. Consequently, softwood requires more strands than hardwood to reach the same strength values, but this is actually beneficial for the board, because it gives higher compactness of the surface layers. As far as the stands are concerned, the strands of softwood are typically long and thin, whereas hardwood strands are wider, thicker and more brittle in the middle.

12. Q: WHAT GIVES OSB SUCH GREAT STIFFNESS?

A: The special strand distribution in the core and surface layers (crosswise orientation), the shape of the wood strands (long and thin) and the quality of the wood used (fully debarked, non-contaminated, free of knots, non-recycled, free of sand, dust and metal inserts).

13. Q: WHICH ARE THE FACTORS THAT DETERMINE THE TYPE OF BOARD?

A: There is not a single factor, but a mix of parameters: from wood selection (proportion of softwood and hardwood), to different mix of binder components (resins, was emulsion, water), the relation of surface/core layers, and, of course, pressing rate and heating temperature.

14. Q: WHY EGGER OSB HAS SUCH A SMOOTH SURFACE? IS THAT AN ADVANTAGE?

A: The smoothness of the EGGER OSB boards comes from the continuous ContiRoll pressing, but also from the wood selection, the quality of debarking & stranding, wax and PMDI content. The advantage of the smooth surface is that is gives the boards an additional moisture protection for about 4 weeks.

15. Q: WHAT IS MUF AND WHAT IS PMDI?

A: MUF (melamine-urea-formaldehyde) and PMDI (polymeric diphenylmethane diisocyanate) are the two most common synthetic resins used now in OSB manufacturing, for bonding the strands to each other while pressing. The difference between them is that PMDI does not include the formaldehyde component in its chemical structure, so this is why PMDI-bonded boards are commonly referred to as "formaldehyde-free" OSB panels. The boards can be produced by using either one single resin (MUF or PMDI) in both core and surface layers, or by using a combination of the two (typically: MUF in the surface and PMDI in the core). The decision of using one or another type of resin belongs of course to the manufacturer, and is more related to availability and price volatility of each type.

16. Q: WHAT ARE THE DIFFERENCES BETWEEN MUF-BONDED AND PMDI-BONDED OSB BOARDS?

A: Except for the difference in the formaldehyde content (HCHO emission for MUF ‹ 0,1 ppm / for PMDI ‹ 0,03 ppm), there is absolutely no difference between boards. All relevant physical and mechanical properties are identical and the boards are classified exactly the same.

17. Q: DOES OSB CONTAIN ANY HAZARDOUS COMPONENTS? IS IT MUF RESIN DANGEROUS?

A: No. Cured glue is not hazardous for human health, but care must be taken in the production process, which is under external surveillance.

SECTION D: USE & APPLICATIONS

18. Q: WHERE OSB CAN BE USED?

A: OSB is mainly used in the construction of new timber frame houses with standard or high energy saving requirements (low energy, passive or zero energy houses), but also for refurbishment of existing houses, for attics conversion and/or for adding storey. But there are a lot of other possible side usage of the product, such as manufacturing of structural I-joist beams with OSB-webs, concrete shuttering, job-site hoarding, construction of stages, billboards, cabinets, shelves, packaging, garages, site barracks, exhibition stands, storage rooms, animal shelters, etc – in other words, whenever a rigid and affordable board is needed for indoor or limited outdoor use.

19. Q: WHICH ARE THE MAIN STRUCTURAL APPLICATIONS OF OSB?

A: OSB is used as a stiffening or load-bearing component of the main structural elements of timber frame houses:

- Walls (External / Internal) ⇢ wall sheathing on studs
- Floors ⇢ structural floor decking on joists (subfloor), rigid underlay for floor covering in floating floors and/or structural floors
- Roofs ⇢ roof sheathing on rafters (rigid underlay for roof covering) or below rafters
- Staircase ⇢ steps (rigid underlay for steps covering)

SECTION E: STORAGE & CONDITIONING

20. Q: WHICH ARE THE STORAGE CONDITIONS FOR OSB?

A: Being a wood-based product, OSB must always be protected against direct contact with water and not subject to high sudden variations in temperature and humidity. There are 2 situations when speaking about storage conditions:

- Warehouse storage
- On-site storage

a) Warehouse storage:

- Always store the boards indoor, in a dry and ventilated area, away from rain dropping and snow
- Always store the boards on a stable and horizontal platform
- Always store the boards (bundles) on top of each other by intermediate supports (wood spacers) of equal height, perfectly aligned vertically
- Make sure that spacers are spanned at a maximum distance of 80cm, to avoid excessive deflection of the boards from the bottom of the stack
- Make sure that the length of the spacers is equal to the width of the board
- Always stack bundles of equal length (never stack longer-size bundles on top of short-size bundles)

b) On-site storage:

- Always keep outdoor storage on-site for as short as possible (indoor storage inside the building is always preferred)
- Always store the boards on sufficient height wood pallets or supports to avoid direct contact with water of vegetation
- Always protect the boards against unexpected rain or snow by covering them with waterproof membranes (plastic foils, lorry canvas, etc)
- When applying the water protection, make sure it allows the free ventilation of the boards on the sides and on the bottom
- Make sure the canvas (foil) is firmly secured against wind blowing
- Cut and remove the fixing strips from the bundle at delivery on site, to reduce the stress in the boards

21. Q: HOW MANY OSB BUNDLES (PALLETS) ARE ALLOWED TO BE STACKED ON TOP OF EACH OTHER?

A: Maximum 6 pallets in a raw (2t/pallet), for normal-size panels (length ‹ 3m)

22. Q: WHY THE CONDITIONING OF OSB IS IMPORTANT AND HOW MUST BE DONE?

A: When delivered from the manufacturer's warehouse, the boards have a moisture content of 5-6%. On the way to the final installation place (including transport, warehouse storage at distributor and job-site storage), the moisture content of the boards is getting higher, as the moisture tends to cope with the environment. In order to avoid the dimensional changes in panel thickness, length or width (swell, expansion or shrinkage) due to the moisture uptake of the boards, they must be allowed to reach their equilibrium moisture (EMC) before being fixed on the supports. This is called conditioning, and is done for a minimum period of 48 hours prior to installation, by storing the panels in the environment conditions of the place where they will be installed. The right way to condition the boards is to lose laying them over the floor on wood battens or to lean them on the wall, with their long edge across wood spacers. For proper ventilation, a pair of batten spacers must be inserted vertically between panels. Special attention must be given to T&G boards, which should rest only on the groove side.

23. Q: WHAT IS THE MAXIMUM STORAGE ALLOWED FOR OSB?

A: If properly stored in dry and ventilated indoor conditions, protected by rain, snow and sunshine, the lifetime storage of OSB boards stands unlimited (years).

SECTION F: ON-SITE INSPECTION & TESTING

24. Q: DOES THE QUALITY OF OSB CAN BE ASSESSED BY THE VISUAL INSPECTION?

A: The check of conformity with the purchase documents must be done at the distributor's warehouse, while on the job-site, the panels must be inspected prior to installation, to make sure the board type and dimensions comply with the intended application. This means to confront the marking from the product / label with the documents of origin and with the product data sheet. Visual inspection is merely meant to identify and conclude rapidly upon the total quantity of mist-delivered and/or damaged product (having crashed edges/ corners from transport or unloading), rather than to evaluate the product quality. This can only be done in laboratory conditions, following the testing procedures given in standards.

25. Q: WHAT BASIC TESTS CAN BE PERFORMED BY CUSTOMERS TO ASSESS THE QUALITY OF THE PRODUCTS?

A: None. No relevant property of the product (swelling, density, bending strength, stiffness, fire behavior, μ-value, λ, etc) can be checked on-site; they all require controlled testing conditions that can be provided only in the lab.

26. Q: IS THERE ANY TEST THAT CAN BE DONE ON-SITE TO PROVE THE DIFFERENCES BETWEEN DIFFERENT PRODUCTS (EX: OSB/3 VERSUS OSB/2)?

A: No, for the same reasons as described above.

SECTION G1: OSB/3 VERSUS OSB/2

27. Q: WHAT IS THE DIFFERENCE BETWEEN OSB/2 AND OSB/3? BUT BETWEEN OSB/3 AND OSB/4?

A: The main differences between OSB/2 and OSB/3/4 are:

a. domain of use (service class):

- OSB/2 ⇢ indoor structural use in dry conditions, SC1 (RH ≤ 65%)
- OSB/3 and OSB/4 ⇢ interior or external protected use in humid conditions, SC1 & SC2 (65% ≤ RH ≤ 85%)

b. Swelling limits ⇢ ≤ 20% (OSB/2) / ≤ 15% (OSB/3) / 10%-12% (OSB/4)

c. Strength (MOR) and stiffness (MOE):

		Board thickness (mm, nominal)				
		6 to 10	› 10 to ‹ 18	18 to 25	› 25 to 32	› 32 to 40
OSB/2, OSB/3	MOR (II), N/mm²	22	20	18	16	14
	MOE (II), N/mm²	3,500	3,500	3,500	3,500	3,500
OSB/4	MOR (II), N/mm²	30	28	26	24	22
		4,800	4,800	4,800	4,800	4,800

28. Q: WHAT ARE THE ADVANTAGES OF OSB/3 COMPARED TO OSB/2?

A: Higher durability and moisture resistance are the most important advantages of OSB/3 compared to OSB/2. As from the mechanical properties point of view (MOR, MOE, internal bond) there is no difference between OSB/2 and OSB/3, it is the swelling rate that makes the difference between the panels and limits the domain of use for each type of board:

- Internal use in dry conditions (RH ≤ 65%) for OSB/2 ⇢ service class 1
- Internal or protected external use in dry and humid conditions (65% ‹ RH ≤ 85%) for OSB/3 ⇢ service class 1 & 2

According to the harmonized European design standard for timber structures EN 1995-1-1 (Eurocode 5) and to EN 335 (wood protection), the outside sheathing of external building components like roof and external walls is classified as usage class 2, requiring materials classified as service class 2, that is OSB/3 or OSB/4. From this point of view, OSB/2 can only be used for internal structural floors and partition walls or for non-ventilated roofs, where the insulation is installed above the roof sheathing.

Due to its reduced swelling rate (≤15%), OSB/3 swells, shrinks and expands less than OSB/2 (≤20%), which means reduced stress-strain of the fasteners due to change in panel thickness, which further implies a reduced risk of squeaking. Other advantages: better sound insulation and better reaction to fire of OSB/3 and OSB 4 TOP (class D-s2, do) compared to OSB/2 (reaction to fire class E) for thickness range 9-12mm, due to slightly higher density (≥ 600 kg/m³ versus ≥ 580 kg/m³).

29. Q: WHICH ARE THE DIMENSIONAL CHANGES OF OSB/2 AND OSB/3 DUE TO MOISTURE UPTAKE?

A: The dimensional changes in thickness, length and width are normally calculated as % change (shrinkage/expansion/swelling) in length/width/thickness per each 1% difference in moisture content of the boards.

The difference in moisture content of the boards represents the difference between the equilibrium moisture content (EMC) that the boards are expected to reach in a given environment conditions, and the initial moisture content of the panels when delivered from the manufacturer's warehouse.

Table 1 from CEN TS 12872 gives a general indication of the range of moisture contents of wood-based panels in various conditions, whereas Table 2 gives an orientation on the dimensional changes in length/width/thickness of wood-based panels expected at a 1% increase in the board's moisture content:

storage of OSB boards stands unlimited (years).

TABLE 1 – EQUILIBRIUM MOISTURE CONTENT AND CONDITIONS OF USE

Service class	Normal range of relative humidity (RH) at 20oC	Approximate equilibrium moisture content (EMC) %	Conditions of use
SC 1	30% - 65%	4% - 11%	Dry installation, no risk of wetting in service
SC 2	65% - 85%	11% - 17%	Risk of wetting during installation and occasional risk of wetting in service
SC 3	› 85%	› 17%	Risk of regular wetting in service

TABLE 2 – DIMENSIONAL CHANGE FOR A 1% CHANGE IN PANEL MOISTURE CONTENT

Type of panel	Specification	Dimensional change at 1% change in panel moisture content		
		Length (%)	Width (%)	Thickness (%)
OSB	OSB/2	0,03	0,04	0,7
	OSB/3 and OSB/4	0,02	0,03	0,5

Having these values, we can compare the dimensional changes due to moisture uptake of OSB/2 and OSB/3 panels (board size 2,440x1,220x11mm) installed as roof-sheathing (say SC2 conditions: RH ~75%, EMC ~ 15%), assuming that panels moisture content in dry state (when leaving the factory) is 6%:

Type of panel (size 2,440x1,220x11 mm)	Dimensional changes in mm for Δ = 9% difference in panel moisture content		
	Length (mm)	Width (mm)	Thickness (mm)
OSB/2	6,59	4,39	0.69
	(2,7 mm/m)	(3,6 mm/m)	
OSB/3 and OSB/4	4,39	3,29	0,50
	(1,8 mm/m)	(2,7 mm/m)	

30. Q: WHAT KIND OF PROBLEMS SHOULD BE EXPECTED IN TIME FOR ROOFS USING OSB/2 SHEATHING?

A: According to Eurocode 5 (EN 1995-1-1: design of timber structures) and to EN 335 (wood protection), the outside sheathing of external building components like roof and external walls is classified as usage class 2, requiring materials classified as service class 2, that is OSB/3 or OSB/4. The fact that a house is build-up in a warm climate (say Mediterranean) is not sufficient for the use of OSB/2 as roof-sheathing. All risks associated to the use of OSB/2 in roof-sheathing result from the higher swelling rate of OSB/2 compared to OSB/3. Higher swelling means always:

- Higher deflection of the roof decking between supports ⇢ risk: deformation in the roof covering
- Loosing the fixing strength of fasteners ⇢ risks:
- increased roof vulnerability against wind suction
- perforation of the roofing membrane or damaging roof covering (especially asphalt shingles) by the pull-out fasteners

SECTION G2: OSB VERSUS PARTICLEBOARDS

31. Q: WHAT IS THE DIFFERENCE BETWEEN OSB AND PARTICLE BOARDS?

A: First, there is the board composition:

- OSB ⇢ are 3-layers oriented-strands panels made of 100% fresh wood (w/o recycling and defects)
- particleboards ⇢ are 3-layers flat pressed chipboard made of woodchips from residual or recycling sources

Second, there is the structural behavior:

- OSB exhibits typically 2-2,5 times higher values of strength on the major axis (length) compared to minor axis (width); particle boards show uniform distribution all over the panel
- Due to higher density and glue content, particleboards shows a slightly better swelling ratio
- However, OSB is 40-60% more efficient than particle boards in terms of static design values for bending strength (MOR) and bending stiffness (MOE) ⇢ this means that generally we may choose smaller thicknesses of OSB in structural applications than for particle boards (ex: 12mm OSB instead of 15mm P5)

SECTION G3: OSB VERSUS PLYWOOD

32. Q: HOW OSB PERFORMS COMPARED TO PLYWOOD?

A: The use of OSB is limited to service class SC 1 (interior structural use in dry conditions, RH ≤ 65%) and SC 2 (interior or external protected structural use in humid conditions, 65% ≤ RH ≤ 85%), whereas plywood can be used structurally both inside (in dry SC1 or humid SC2 conditions) and outside (SC3 highly humid conditions, RH › 85%), depending on its technical class. The strength of plywood varies widely, depending on the wood species, number of layers and resin type. As an example, the modulus of elasticity on the major axis ranges 4,000-8,000N/mm^2.

SECTION G4: OSB VERSUS SOLID WOOD

33. Q: WHICH IS THE BENDING STRENGTH AND STIFFNESS OF SOLID WOOD COMPARED TO OSB?

A: The bending strength and bending stiffness (modulus of elasticity) of solid wood is much higher than OSB's, since solid wood is used for the structural elements of the timber frame (beams, studs, rafters), that should resist to all the static and dynamic loads that are transferred to them via the building's floors (made of OSB-sheathing). Just as an example, the design value of the MOE for solid softwood is ~ 10,000 N/mm^2, whereas the design value for OSB/3 on major axis is 4,930 N/mm^2 (or 6,780 N/mm^2 for OSB 4 TOP). In case of using softwood-glulam, this value goes up to 11,000 N/mm^2, or up to 12,500 N/mm^2 for hardwood-glulam (beech, oak). On the other hand, the MOE on minor axis is much lower for solid wood compared to OSB:

- solid softwood: MOE90º = 300 N/mm^2 / solid hardwood: MOE90º = 600 N/mm^2
- OSB/3: MOE90º = 1,980 N/mm^2 / OSB 4 top: MOE90º = 2,680 N/mm^2

SECTION H: TONGUE & GROOVE (T&G)

34. Q: WHAT ARE THE ADVANTAGES OF T&G PROFILES COMPARED TO STRAIGHT EDGE OSB BOARDS?

A: In case of sheathing with straight-edge panels, an expansion gap of 2-3 mm must always be left between the adjacent boards (on all 4 sides) when fixing them to the supports. If working with T&G milled-edge boards (asymmetrical 2 or 4 sides), this issue is no longer needed, as the T&G profile already incorporates in itself a 1mm dilatation gap, so we skip checking the correct alignment and save some time. Secondly, when using straight-edge boards for floor decking or wall sheathing, the panels must be supported on all the 4 edges, in order to reduce deflection and improve the stiffness. This means the long edge of the boards must be fixed on additional supports (noggins). In case of roof sheathing, the noggins must be replaced by H-clips to reduce deflection between adjacent panels, and additional bracing stripes must be provided for stiffening the structure. All these means additional labor and material costs, that can be eliminated by using T&G boards instead, which require only their short edges to lay on supports.

SECTION I1: MOISTURE BEHAVIOR & RAIN

35. Q: HOW OSB BEHAVES WHEN EXPOSED TO MOISTURE?

A: As any other wood product, OSB exhibits mild dimensional changes (shrinkage or dilatation in length/width) when exposed to changes in moisture and temperature of the surrounding environment. This effect is covered in the design of the structure by using sufficient expansion gaps. In order to limit the dimensional change effects, different technical classes (types of boards) are available, so that the right board must always be chosen depending on the conditions of each application (external wall, roof). As a general rule, OSB must always be protected against direct contact with water (rain, snow, infiltrations) during all stages of its intended use – from warehouse to job-site storage, transportation, installation and daily use within the building lifetime. In the particular case of concrete screeds casted on OSB subfloors, is mandatory to cover the OSB flooring panels with a waterproof membrane, in order to avoid the moisture uptake caused by this wet building process.

36. Q: WHAT ARE THE NEGATIVE EFFECTS OF EXCESSIVE MOISTURE UPON OSB?

A: Excessive moisture generally favors the creation and spread of fungus and mould inside the building envelope or on the surface of building components and their connections when ventilation is poor (room corners, wall-to-ceiling edge, balconies, etc), but most important is that a moisture content › 18% reduces the load-bearing capacity of the wood structural elements. The following effects are associated with high moisture in the building elements:

- greater deformation caused by swelling of wood and wood-based materials
- higher pull-out (withdrawal) stress on fasteners (nails / screws / staples)
- reducing load-bearing capacity, and thereby increasing deformation under static loads
- reducing the efficiency of the embedded thermal insulation (mineral wool, hemp, blown cellulose)

37. Q: WHAT IS TO BE DONE IF AN UNEXPECTED RAIN IS WETTING THE OSB BOARDS ALREADY INSTALLED AS STRUCTURAL FLOORING, PARTITION WALLS OR ROOF SHEATHING?

A: The builder is fully liable for any damage caused by improper protection of the building elements against rain during all stages of construction process. Anticipation and effective preventive measures for avoiding such unpleasant situation is therefore mandatory. However, when such situation occurs, the exposed panels and wood components (open beams, studs and rafters) must be covered immediately in the best possible way to limit their soaking, and the water puddles must be drained away as soon as possible by suitable measures. The protection must be removed only when rain has stopped and no other precipitations are forecasted, so the surface can dry out again. Before proceeding with further installation, loosen strands should be removed by sanding.

38. Q: FOR HOW LONG COULD OSB BOARDS STAY UNCOVERED (EXPOSED), W/O THE RISK OF ALTERING THEIR STIFFNESS AND BENDING POTENTIAL?

A: It depends on the climatic conditions that are specific to each country, on the type of boards used, and of course, on the duration and intensity of any unexpected rain, that can range from episodic shower to unstopped raining days. From our experience gained by weathering tests (2 months), depending on the moisture uptake, the OSB/3 and OSB 4 TOP can loose about 20-25% in strength and stiffness when re-dried to moisture content ‹ 18%, which is the limit value for service class 2 panels (humid conditions).

As long as the boards do not exceed 18% in moisture content, it can be assumed that there is no critical effect on the structural use. Considering the above, max. 8 weeks open construction (exposure to weathering) shall not be exceeded during installation, presuming that only episodic rain shower take place.

39. Q: FOR HOW LONG THE CARPENTERS SHOULD WAIT FOR THE ALREADY INSTALLED OSB PANELS TO DRY-OUT (IF WETTED BY RAIN) BEFORE PROCEEDING FURTHER WITH INSTALLATION?

A: From our own experience, the panels that got wet by a normal rain (few hours) must be left to dry-out at least one full day in summer and 2-3 days in autumn, provided that day (days) is/are warm and shiny, so that not very humid.

SECTION I2: FIRE BEHAVIOR

40. Q: HOW TIMBER FRAMES HOUSES BEHAVES IN CASE OF A FIRE?

A: Wood and wood-based panels are combustible materials. Used properly in suitable combination with non-combustible materials, they can provide sufficient protection to the structural elements (columns, beams, floors) of the house, thus allowing these elements to keep unaltered their load-bearing capacity for a longer period of time. The many studies conducted on improving the fire regulations regarding the structural fire design of buildings allowed wood to be safely used as structural component not even in single-family houses, but also in the erection of office and multi-storey apartment buildings.

EGGER has a very good experience and can provide tested and practical solutions for walls and floors to safely sustain fire to 30-90 minutes. From our own experience, fire resistance up to 45 minutes can be achieved by using only combustible materials, while for higher fire requirements is needed to combine wood-based panels with other non-combustible materials (stonewool, fire-resistant plasterboards, gypsum fibreboards, surface coating with fireproofing agents, etc).

More information regarding fire tested solutions for walls, roofs and floors are available on Egger's website and on www.dataholz.com, to which EGGER contributed in the research program.

41. Q: WHAT IS THE FIRE BEHAVIOR OF OSB?

A: The standard EN 13501-1 establishes 7 reaction to fire classes of building materials (also known as Euro-classes): A1, A2, B, C, D, E and F, of which A1 & A2 are incombustible. Standard wood-based panels (including OSB) belong to Euro-classes D and E. The reaction to fire of Eurostrand OSB is:

- OSB/2 ($\rho \geq 580$ kg/m^3): class E (for thickness $t \leq 12$mm) / class D-s1, d0 (for $t > 12$mm)
- OSB/3 ($\rho \geq 600$ kg/m^3): class E (for $t \leq 8$mm) / class D-s2, d0 (for $t \geq 9$mm, CWFT)
- OSB 4 TOP ($\rho \geq 600$ kg/m^3): class D-s2, d0 (CWFT)
- Walls (External / Internal) ⇢ wall sheathing on studs
- Floors ⇢ structural floor decking on joists (subfloor), rigid underlay for floor covering in floating floors and/or structural floors
- Roofs ⇢ roof sheathing on rafters (rigid underlay for roof covering) or below rafters
- Staircase ⇢ steps (rigid underlay for steps covering)

42. Q: WHAT MEANS CWFT AND WHEN IT APPLIES?

A: Classification Without Further Testing (CWFT) is a procedure established for standardized products, based on the extensive research supported by wood-based panels industry. It can be found in Table 8 from EN 13986. Essentially, it is a method used for the easy identification of the reaction to fire class (Euroclass) of wood-based panels according to EN 13501-1, and applies to boards of minimal thickness 9mm and densities $\rho \geq 600$ kg/m^3, when referring to OSB. For a manufacturer, this means that as long as the product complies with the requirement values given in Table 8, he shouldn't perform any additional fire testing within the scope of FPC. However, for OSB boards of thicknesses lower than 9mm and having densities under 600 Kg/m^3 (ex: OSB/2, having declared density $\rho \geq 580$ kg/m^3), CWFT is not applicable, so the panels must be tested by the producer, who is obliged to declare the values and to mark the Euroclass on the panel or on the package.

43. Q: WHAT MEANS "S" OR "D" IN THE REACTION TO FIRE CLASSIFICATION?

A: "s" stands for smoke release, and "d" for burning droplets potential of the product. There are 3 smoke classes (s1, s2, s3) and 3 burning droplets classes (d0, d1, d2) assesed. The OSB boards classified as CWFT ($t \geq 9$mm and $\rho \geq 600$ kg/m^3) belongs to Euroclass **D-s2, d0**, meaning: **normal combustible (D) – medium smoke release (s2) – no burning droplets (d0)**. The reason why smoke release potential of building products is given so much importance is because smoke and gases produced by combustion are the main killers in a fire. On the other hand, the potential of a building material to burn with droplets is also important, as they can facilitate the rapid spread of fire to other materials or different sections of the building (typically, from one storey to another, through the façade). The meaning of burning droplets is:

- d0 = droplets formed by burn are self-extinguishing within 10 seconds from ignition
- d1 = droplets are self-extinguishing within 10 seconds in the first 10 minutes
- d2 = the material is burning with droplets

44. Q: WHAT IS THE MEANING OF EACH EUROCLASS?

A: The current classification used in the harmonized European standard EN 13501-1 for assessing the reaction to fire of building products differs totally than national classification used in the past by each country, that normally classifies the building materials in terms of their combustibility, as incombustible and combustible (with different segmentation, ranging from hardly combustible to heavy combustible & highly flammable). What is important is to know that OSB belongs to.

45. Q: DOES THE DIFFERENCE BETWEEN E-CLASS AND D-CLASS CAN BE PROVED BY A JOB-SITE TESTING

A: No, that is impossible. Fire testing of building materials is strictly regulated by standard procedures, and requires laboratory conditions that cannot be provided empirically, on the job-site.

46. Q: HOW IS POSSIBLE THAT OSB/2 OF THICKNESS ≥ 15MM TO HAVE BETTER FIRE BEHAVIOR THAN OSB/3, FOR THE SAME THICKNESS RANGE?

A: This comes from the different procedure used when the products have been tested and classified:

- OSB/3 of thickness ≥ 9mm and density ρ ≥ 600 kg/m^3 meets the requirement criteria used for CWFT, so therefore they were classified directly as "D-s2, do" by using Table 8 from EN 13986. The values in Table 8 are the result of an intensive EN research program conducted by the Swedish Fire Testing Institute "SP BORAS" in 2004, which performed on the behalf of the CEN Committee a cross-testing of many boards, selected from different wood-based panel manufacturers. The minimal achieved results were documented as representative for each product type and accepted by the whole wood industry ever since
- The classification "D-s1, do" of Eurostrand OSB/2 for board thickness › 12mm and density ρ ≥ 580 kg/m^3 was gained and declared by EGGER's own testing. In 2004 when the test was done was sufficient to test having the boards tightly fixed to an A2 substrate (mineral wool), so there wasn't much oxygen accelerating the burning and smoke release. This is why the smoke release rate was "s1" (low smoke release), which is better than "s2" (normal smoke release). However, for thicknesses ≤ 12mm, the testing result lead to an "E-class" classification for OSB/2, and that was the same situation with OSB/3 of thickness range 6-8mm.

SECTION 13: FUNGUS / DECAY / MOULD

47. Q: DOES OSB FAVOR THE FORMATION AND SPREAD OF FUNGUS OR MOULD?

A: Being an engineered panel, manufactured under high pressure and temperature conditions (around 150oC), the wood strands within OSB are totally inert, and no harmful wood pests can survive the process. If correctly installed in diffusion open cladding systems and sufficient ventilated roofing systems, provided the building is constantly heated, its external walls are sufficient thermally insulated and the rooms are natural aerated on regular basis, mould formation will not occur.

48. Q: DOES OSB CAN BE AFFECTED BY TERMITES OR OTHER INSECTS DECAY?

A: Yes, it can. To withstand termite attack, OSB has to be treated with special chemical preservation additives. EGGER can offer termite treated OSB, which is produced successfully for Australian market since 2005. The boards carry the New South Wales brand certificate for H2 treatment.
According to EN 335 (wood preservation), OSB is not endangered by insects in the usage class 1 & 2. No preservative treatment against insects decay (except termites) by chemical additives is required.

SECTION J: DENSITY

49. Q: WHICH IS THE DENSITY OF OSB BOARDS?

A: The product standard for OSB (EN 300) does not provide any requirement value for density. The densities of EGGER OSB can be found in the product data-sheets. Their range: OSB/2 ≥ 580 kg/m³, OSB/3 ≥ 600 kg/m³, OSB 4 TOP = 600-640 kg/m³

50. Q: IS THE DENSITY OF THE OSB VARIABLE WITH THE THICKNESS OF THE BOARDS?

A: Yes. The smaller the thickness, the higher the density, provided however that the minimum density for each board type complies with the product data-sheet.

51. Q: WHAT IS THE BENEFIT OF A HIGHER DENSITY OSB BOARD?

A: Density is a property which is related to many other properties of OSB, such as:

- Strength and stiffness
- Embedding strength of fasteners
- Fire resistance
- Air permeability
- Water vapour diffusion resistance
- Sound insulation

All these properties improve with higher density.

SECTION K: FORMALDEHYDE

52. Q: DOES FORMALDEHYDE (HCHO) CONTAINED IN THE BOARDS CAN AFFECT THE HUMAN HEALTH?

A: Solid wood contains naturally a small amount of formaldehyde, in average ‹ 0,03ppm. The low-content formaldehyde boards (E1 class, as defined by EN 300), are not hazardous products for human health. The HCHO content of such panels is limited to maximum 8mg/100g of oven-dry board (single value). Additionally, FPC statistics have to prove that the rolling half-year average of the perforator value (EN 120) does not exceed 6,5mg/100g. If the chamber method is used for the determination of the formaldehyde content (according to 717-1), then the steady state emission value of HCHO must be ≤ 0,124mg/m³ of surrounding air (or ‹ 0,1ppm). Boards whose HCHO content is exceeding these values belong to formaldehyde class E2. The European wood-based panel's manufacturers have committed voluntarily to deliver only E1 boards to the market.

53. Q: WHAT MEANS FORMALDEHYDE-FREE BONDED OSB?

A: Formaldehyde-free bonded OSB panels are produced using resins that do not add any formaldehyde to the product, such as PMDI (polymeric diphenylmethane diisocyanate). Although the existing product standard EN 13986 does not officially recognizes such a formaldehyde class and refers only to E1 and E2 classes, most manufacturers are „marketing" their formaldehyde-free bonded OSB panels under own brands (ex: E0, TOP, ECO, F****), having the HCHO content ‹ 0,03ppm acc. EN 717-1, that complies with the natural formaldehyde content of solid wood.

SECTION L: EXTERNAL USE

54. Q: DOES OSB CAN BE USED ON THE OUTSIDE OF THE BUILDING ENVELOPE (EXTERNAL TO STUDS/RAFTERS)?

A: OSB/3 or OSB 4 TOP can be installed as outside sheathing, but only covered by additional skins, such as cladding (ventilated or non-ventilated façades) or roof covering (asphalt shingles, metal roofing, clay/concrete tiles, etc). OSB left exposed (not protected) to weathering is not allowed!

55. Q: ARE THERE ANY BOARDS THAT CAN BE USED EXTERNALLY?

A: Yes, wood-based panels certified as service class 3 (exterior grade) can be used.

SECTION M1: EXPANSION GAPS

56. Q: WHAT ARE THE EXPANSION GAPS AND WHERE THEY SHOULD BE PROVIDED?

A: Expansion (dilatation) gaps are narrow distances that must be provided at the panel joints when fixing the straight-edge OSB boards on supports, in order to avoid dilatation stress on the board's edges that could lead to buckling and disturbing squeaking noises. Expansion gaps allow the boards to expand unrestricted before reaching the equilibrium moisture, which is likely to happen if the panels were not conditioned to the end-use climate before being installed. The following rules must be noticed:

d. A dilatation gap of 2-3mm must be provided between all adjoining boards when fixing them on the supports; the gap must be continuous on all the 4 edges of each panel
e. A dilatation gap of 15mm must always be left on the room perimeter, between the floor-decking boards and the walls, if T&G panels are used; if using straight-edge panels, the expansion gap can be lower, and should be calculated
f. A dilatation gap of 25mm must be left from the floor when fixing the boards on the studs, for the wall sheathing
g. A permanently elastic expansion gap of 10mm must be provided every 10m of continuous sheathing (floor, roof, wall)

For more details regarding correct installation of panels, the manufacturer's guideline must be consulted.

SECTION M2: FIXING & GLUING

57. Q: ARE THE STANDARD CARPENTRY NAILS WITH SMOOTH SHANK RECOMMENDED FOR THE OSB FIXING ON SUPPORTS?

A: When fixing OSB, priority should be given to the use of galvanized wood screws (self drilling or self tapping), spiral / ring nails or staples. Smooth shank nails are less suitable, because of their lower pull-out resistance. Please follow the general installation instructions of the OSB manufacturer regarding the fasteners selection and the fixing distance.

58. Q: CAN OSB BOARDS BE GLUED TO ONE-ANOTHER, IN CASE OF MULTI-LAYER SHEATHING?

A: Yes. When 2 boards are needed to be fixed to one another – for instance, in case of a double layer floating floor -, gluing is also a possibility. Permanently elastic adhesives based on polyurethane or silane are suitable. Sanded boards are more suitable for gluing. If using unsanded panels, is mandatory to slightly sand the surface before applying the binder, to increase the glue adhesion. Exception is given to EGGER OSB 4 TOP, using the glue type Purbond HB 180/440/530. The base boards must be plane, strong and dry, free of any loose or crumbly particles, free of oil, dust and dirt. The adhesive can be applied either spread on the whole surface by means of a notched trowel, or „on-bead" by using a gun, that is in longitudinal continuous lines spaced 120-150mm.

SECTION M3: SURFACE TREATMENT & PANEL FINISHING

59. Q: CAN OSB BOARDS BE PLASTERED, PAINTED OR WALLPAPERED?

A: Yes, but in order to avoid the visible undesired „ bleeding stains“ of the support, we highly recommend to use sanded OSB panels and to apply 2-3 thin layers of primer before starting to plaster or paint. Also, we recommend to perform the so called „paint test“, to check the compatibility of the paint compounds with wood.

60. Q: CAN OSB BE USED AS FINAL FINISHING LAYER?

A: Absolutely. The wood strands in the surface layer of the boards “ennobles” and give walls or floors surface the warm and rustic look of the natural wood. For an improved visual appearance and a dust-free surface, we recommend the use of T&G sanded panels, which can be simply coated with transparent or pigmented wood lacquers.

61. Q: WHAT KIND OF GLUE IS SUITABLE FOR FIXING THE MASSIVE PARQUET ON OSB UNDERLAYMENT?

A: We recommend in all cases the use of permanent elastic water-free wood adhesives (polyurethane-based) for gluing massive parquets on OSB underlayment, to avoid excessive shrinkage of the parquet caused by moisture uptake from the binder. It goes without saying that the surface of underlayment (OSB) must be absolutely dry, stable, and free of dust, dirt, grease and any other loose or crumbly particles.

SECTION N: SQUEAK

62. Q: IS IT TRUE THAT THE FLOORS OF TIMBER FRAME HOUSES USUALLY SQUEAK?

A: No, squeaking can be easily avoided, following the given recommendations:

- Correct choose of the boards, regarding type and thickness
- Proper conditioning of the boards prior to installation
- Use of the recommended type of fasteners
- Provide sufficient expansion gaps
- Choose mainly T&G panels with glued edges
- Use kiln-dried wood for the supporting beams ($u \leq 20\%$)
- Use beams with the correct cross-sections and spanning resulted from the static design

63. Q: WHAT IS CAUSING SQUEAKING NOISE?

A: Squeaking is usually generated by:

- The stress-strain of fasteners produced by the swelling (increase in thickness) of the boards due to rise in their moisture content
- Insufficient expansion gaps left between the edges of adjacent panels when fixing them on the supports. That can lead to panel’s friction as a result of board expansion in length and width, associated to the increase in moisture content.

SECTION O: ETICS

64. Q: IF USING AN EXTERNAL BONDED INSULATING SYSTEM (ETICS) FOR INSULATING THE SIDE ENVELOPE OF A HOUSE, WHAT KIND OF BONDING IS SUITABLE TO BE APPLIED ON OSB?

A: Fixing of ETICS on the external walls of the building is commonly done by first bonding the insulation boards (stonewool, EPS) on the walls with adhesive mortar (cement based), and second by additional mechanical fixing with dowels. When the fixing support is masonry, concrete or aerated concrete (Ytong), the use of dowels is okay, but in case of OSB, they just cannot be used, because the fixing element is too thin for them to anchor. In this case, mechanical fixing is not possible and the insulating boards should only be bonded. To select the right adhesive, please contact the manufacturer of the ETICS system.

65. Q: WHAT IS THE MOST SUITABLE INSULATING PRODUCT FOR ETICS (MINERAL WOOL OR POLYSTYRENE)?

A: In order to avoid the damages resulting from the accumulation of condensation water inside the building elements, EGGER always recommends the diffusion open systems for external walls and roofs. A typical such system for the external walls of a timber frame house consists of OSB wall sheathing on the inside, and a paneling with a diffusive / vapor permeable product (such as DHF or wood-fibreboards) on the external side of the studs.

When a diffusion closed system is chosen (for instance, with OSB on the inside and outside), the insulation of the walls is commonly provided by the use of external thermal insulating cladding systems (ETICS), whose insulating component is either mineral wool or EPS / expandable polystyrene (most common). Since the façade mineral wool is hydrophobic (that is, it leaves the vapors to go out, but doesn't allow moisture to get in), is more likely that condensation will not occur when using these products, so therefore we recommend the use of mineral wool.

SECTION P: LIFETIME & WARRANTIES

66. Q: WHAT IS THE LIFETIME OF THE OSB BOARDS?

A: If correctly stored, transported, handled, installed and maintained over the lifetime of the building, the OSB boards keep unaltered their mechanical properties for at least 50 years.

67. Q: DOES EGGER PROVIDE ANY WARRANTY FOR ITS EGGER OSB BOARDS?

A: EGGER fulfills all its duties as manufacturer according to the European Construction Product Regulation (CPR). The relevant documents are the Declarations of Perfomance for each CE-marked product.

SECTION Q: MISCELLANEOUS

68. Q: WHAT OTHER PRODUCTS BELONG TO OSB RANGE?

A: Some manufacturers have enlarged their OSB product range by developing own products for specific applications (aluminum faced radiant barrier, flame retardant boards, airtight cellulose laminated layer, plywood coated boards, etc).

69. Q: DOES QSB IS JUST ANOTHER BRAND NAME FOR OSB?

A: No. QSB is a brand of a European wood-based panel manufacturer. The name stand indeed for Quality Strand Board, but the product is not OSB. It is a single layer highly pressed P5 particleboard that meets the requirements of EN 312 as structural board for use in humid conditions. However, the mechanical performance values (bending strength and bending stiffness) of QSB are significantly lower than OSB's, for the same panel thickness.

70. Q: WHAT IS A RADIANT BARRIER OSB?

A: Radiant Barrier OSB is an OSB board coated on one side with a special fine perforated reflective aluminium foil that is applied to the panel via adhesive laminating. They are used in roof and external wall's sheathing to effectively reduce the transmission of radiant heat from the sun, in other words to reduce the heat loss in winter and the excessive solar gain in summer. In order to allow the proper functioning of these boards, a ventilated gap of minimum 25mm must be provided between the board's aluminum side-face and the thermal insulation of the wall/roof. They are always installed with the ALU-face toward the support (interior).

71. Q: SOME OSB PRODUCTS HAVE ROUGH SURFACE ON SIDE? WHAT IS THIS FOR?

A: The one-side rough surface is typical for the old fashioned multi-daylight press with mat forming on wire-mesh. It brings an advantage for carpenters, when the product is used for roof sheathing (especially for high-slopes roofs), where the smooth surface of standard OSB can become slipping, when wet. Unfortunately, the rough surface is not possible with continuous ContiRoll pressing.

72. Q: DOES OSB MAY CAUSE CORROSION OF DISCOLORING OF ZINC-COATED METAL ROOF COVERING?

A: The corrosion problem is mainly relevant for zinc metal coverings. It has nothing to do weather the rigid underlay (roof decking) is made up of OSB or timber. The reason is that zinc is chemically reacting with water. Here it is absolutely necessary to provide an underlayment which prevents the water drops (for instance, from condensation) to get in contact with the bottom of the zinc. For slopes < 160 zinc-roof manufacturers recommend/demand special underlay (roofing membranes), such as DuPont "Tyvek Metal" for instance.
For copper, aluminium or steel, this kind of corrosion problem is not relevant.

73. Q: WHY SOMEONE SHOULD CHOOSE EUROSTRAND OSB AND NOT OTHER PRODUCT FROM COMPETITION?

A: Because EGGER OSB is a tested and reliable product, with excellent performances and proven track record of constant quality. And because EGGER is offering a lot of other advantages, such as:

- Long term and reliable partnership to his customers
- Commitment for quality and continuous development of the product range
- Market related stock program
- Provides intensive marketing and technical support in application techniques
- Good product range and complementary products (DHF)
- In trend alignment to the market development and needs

74. Q: HOW SHOULD BE DECIDED THE THICKNESS OF THE BOARDS? IS THERE ANY CALCULATION METHOD AVAILABLE?

A: The thickness of the boards depends on:

- application (wall, floor, roof)
- type of the board chosen
- span of the supports
- maximum allowable load that the structural element must support, which normally result from the static design of the building

There are of course design tables that relates the board's thickness with span and load for different loading scenarios (single-span / double-span loading, uniformly distributed or point wise loads) and for different classes of importance of the building (single-family houses, schools, offices, etc). By request, EGGER provides technical support to his customers for choosing the right panel's thickness.
According to our experience, we recommend the following minimum thicknesses of the boards for a typical 600-625mm c-o-c span of the supports (beams, studs, rafters):

- Internal wall: ≥ 10mm
- External wall ≥ 12mm (better **15mm**)
- Domestic floor ≥ 18mm (better **22mm**)
- Roofing ≥ 12mm

75. Q: WHAT IS THE RECOMMENDED THICKNESS OF OSB WHEN USED IN CONCRETE SHUTTERING (FORMWORKS)?

A: Please note that fresh concrete is full of water, and since the curing process is highly exothermic (releases a big amount of heat), common practice recommends additional "showering" of the casted open elements (floors and beams) in the first 24h in hot summer days, to avoid excessive shrinkage that could result from a too fast water evaporation from the casted concrete. This is why we recommend the use of moisture resistant & sturdy panels for concrete shuttering, such as OSB/3 (or better OSB 4 TOP) of minimum thickness of 20mm. To ease the board's removal from the cured concrete, it is highly recommended to treat the inner side of the boards with a mould release agent, prior to casting the concrete into the formworks. Also, in order to avoid any buckling of the boards during curing process, the formworks must be secured with sufficient wood battens on the sides. The right dimensioning and distribution of these reinforcing elements across the formworks stands with the contractor, based on his own experience.

76. Q: FOR HOW MANY SHUTTERING CYCLES DO OSB BOARDS RESIST?

A: If handled with care in both mounting and dismounting, the boards for concrete shuttering may be used up to 3 times or more, provided that panels of right thickness and mould release agents were used.

77. Q: WHAT IS THE DIFFERENCE BETWEEN COLD ROOFS AND WARM ROOFS?

A: The standard CEN TS 12872 gives the following definition of cold and warm roofs:

- Cold Roof = Roof design in which the boards and some of the supporting joists are placed above the insulation. The panels are considered to be under conditions corresponding to service class 2 (humid conditions, 65% < RH ≤ 85%)
- **Warm Roof** = Roof design in which the **boards** supported by joists are placed **below the insulation**. The panels are considered to be under conditions corresponding to service class 1 (**dry conditions**, RH ≤ 65%)

78. Q: WHAT ARE THE BENEFITS OF TIMBER FRAME HOUSES COMPARED TO MASONRY HOUSES?

A: The most obvious advantage is the speed of completion:

- for a house owner that decides to build the house by its own, this means less stress: shorter time spent to coordinate the people on the job-site or to purchase the materials, less trouble with renting special equipment (concrete pumps, formworks, etc), earlier site lock-up with reduced exposure to theft and weathering
- for a potential client that is buying the house from a developer, means he/she can move faster (sometimes, this means saving some money from a flat rental somewhere else)
- for a developer, means earlier cash recovery and improved cash-flow

The prefabrication makes all the above even more obvious, and provides higher savings.

Other benefits:

- Reduced total self weight of the building ⇢ means reduced sizes for foundations = less concrete and reinforcing steel
- Thinner external walls ⇢ means more space gained inside
- Ecological, made of natural products (wood) ⇢ healthy and friendly living environment
- Suitable for Low-Energy and Passive houses

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