DATASHEET

MEDITE® SMARTPLY®
INNOVATIVE TIMBER PRODUCTS

SMARTPLY® ROOF

SMARTPLY OSB panels can be used in the most demanding roofing applications, including: pitched roof (cold & warm), sarking / bracing, flat roofs (cold deck, warm deck sandwich, warm deck inverted), roof cassettes and dormer windows. Panels are available in various sizes with both square edge (SE) and tongue & groove (T&G) profiled edges which enable quick, easy and reliable installation in almost any roof design.

AT A GLANCE > SMARTPLY ROOF:

- PERFECT FOR TIMBERFRAME
- HIGH QUALITY STRUCTURAL PANEL
- MOISTURE RESISTANT
- UKCA AND CE MARKED
- NO ADDED FORMALDEHYDE
- FSC® CERTIFIED

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SMARTPLY®
DEFINING THE STANDARD OF OSB

SMARTPLY® ROOF

FLAT ROOF DECKING SUITABILITY

The selection of SMARTPLY OSB panels for flat roof decking depends on a number of factors of which the most important are:

- The type of floor: Essentially there are two types of flat roof design which have become known as the cold deck and warm deck flat roofs. The distinguishing feature is the location of the insulation relative to the OSB decking

  In the cold deck flat roof, the insulation and vapour control layer are below the OSB decking. In order to reduce both the occurrence of condensation and the associated thermal loss, it is essential that an effective vapour control layer is provided at ceiling level and that there is a void between the deck and the insulation and that this void is well ventilated. OSB should not be used where adequate through-ventilation is not provided, or where prolonged high humidity (beyond service class 2 conditions) is likely to occur.

  In the warm deck flat roof, the insulation and vapour control layer are above the OSB decking thereby almost eliminating the occurrence of condensation within the decking provided sufficient insulation is included. OSB must not be used where the thermal design does not eliminate the possibility of condensation, or where occupancy conditions are likely to lead to high humidity

  Detailed recommendations for control of condensation are given in BS 5250 which now refers to EN ISO 13788 as the method of calculation (Glaser method), but due to the growing emphasis on airtightness and the thermal performance of buildings, SMARTPLY recommends more modern and advanced methods of hygrothermal simulation, as detailed in EN 15026.

  Note: SMARTPLY OSB panels can be specified for both types of flat roof. Always check current regulations specific to the country of use. Some housing warranty and guarantee authorities have specific requirements for both cold and warm deck roofs and it is the designer's responsibility to ensure compliance with all relevant requirements.

- The load that the roof deck has to carry: The actual load to be carried which in turn will assign the construction to a load class as set out in EN 1991 (Eurocode 1) in conjunction with EN 1990 (Eurocode 0). The load that the decking has to carry will depend on whether the flat roof has open access or whether access is restricted only to maintenance. The designer is free to design the roof to carry any specified load in accordance with current standards such as BS 6229, CEN/TR 12872, BS 8103-3 and EN 1995-1-1 (Eurocode 5). It is also the designer's responsibility to ensure that the roof design meets current building regulations, for example structural and thermal requirements.
- The ambient moisture conditions: Moisture conditions can affect the performance of OSB roof panels. Roof structures should be assigned to one of the three service classes defined in EN 1995-1-1 (Eurocode 5). SMARTPLY OSB panels are suitable for use in Service Class 1 and 2. Always check current regulations specific to the country of use. As well as conditions in service, consideration must also be given to the construction phase where high levels of moisture or humidity often exist. In such conditions SMARTPLY strongly recommends the use of OSB/3 or OSB/4. Detailed guidance is provided in the 'Moisture Content' section of this technical datasheet.
- The load duration: The duration of the principal load, which in turn will determine the long-term strength and deflection of the construction. In EN 1995-1-1 (Eurocode 5), these parameters are quantified in terms of a duration of load factor (kmod) and a deformation (creep) factor (kdef). All the relevant factors for roof design are provided in the product Declaration of Performance available on www.mdfosb.com.

SMARTPLY® ROOF

SPECIFICATION & DESIGN

As design values can vary between manufacturers, it is important to ensure that the SMARTPLY OSB panels specified by the designer are those used on site. All SMARTPLY panels are clearly marked with the following information:

a SMARTPLY logo

b UKCA marking
- i. UKCA logo
- ii. Accredited body
- iii. DOP number

c FSC® certification (if applicable)

d CE marking
- i. CE logo
- ii. Notified body
- iii. DOP number

e Relevant Standard (EN13986/EN300) and AVCP level (2+ structural)

f Panel grade (OSB/3 - OSB/4)

g Thickness

h Formaldehyde class (eg - E1)
- i Additional marking:
- i. Date and time stamp
- ii. Main axis arrow
- iii. Product certification (IAB, BBA, WPA, FR BUILD) if applicable

Note: Markings may vary depending on product type.

The most popular panel sizes for roof decking are 2440 x 1220mm SE, 2397 x 1197mm SE, 2397 x 1200mm TG2, 2400 x 600mm TG4 and 2440 x 590mm TG4 depending on market area, although other panel sizes are available. The narrower panels are often preferred for ease of handling as they can be easily carried up ladders and a length of 2400mm suits nominal framing centres of 400 or 600mm. OSB roofing panels are typically 9 to 22mm thick, however thicker panels are available on request. Other thicknesses and dimensions are available depending on the applications and loads applied.

Panels are available in square edge (SE) or tongue & groove (T&G) profiled - on two long edges (TG2) for wide panels or on all four edges (TG4) for narrow panels. 18mm T&G panels are often the preferred choice for GRP roofing as they easily lock together and can reduce air leakage through the roof. Guidance on expansion gaps, laying and fixing is provided elsewhere in this datasheet.

OSB flat roof decks should be designed in accordance with BS 6229. When designing a roof using SMARTPLY OSB roof panels, a “deemed to satisfy” approach may be employed using tables and design guidance for domestic roof applications given in BS 8103-3. Panel selection should be made according to the category of use given in Table 1 (below).

TABLE 1: Maximum recommended centres of support of OSB/3 in flat roof decking:

Application	Min panel thickness (mm)	Max centres of support members (mm)
1 Roofs of small garages and similar buildings (without access other than for maintenance and repair)	11	450
	15	600
	18	600
2 Roofs over habitable areas, with access (in addition to that provided for maintenance and repair)	15	450
	18	600
	22	600
3 Roofs over habitable areas where no access (other than that necessary for maintenance and repair) is provided	11	450
	15	600
	18	600
	22	600

Note: The recommendations in this table are extracted from BS 8103-3. Recommendations are made on the assumption that the roof is constructed in accordance with accepted design principles for weather resistance and control of condensation within the roof. Other thicknesses or spans may be appropriate where supported by calculated design.

If the “deemed to satisfy” approach to design is not applicable for the country of use, recourse must be made to either designing by prototype testing or design by calculation according to EN 1995-1-1 (Eurocode 5) or other relevant standards.

Roofs must be laid to falls and due allowance made for deflection under load when calculating rafters. The preferred arrangement would allow an even fall of not less than 1 in 40 which is generally sufficient to compensate for deflection.

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PITCHED ROOFING (SARKING) SUITABILITY

SMARTPLY OSB panels are also suitable for use in pitched roofing as a sarking layer subject to the same structural and environmental considerations as for flat roof decking. The selection and thickness of panels for use as a sarking material depends primarily on whether or not the sarking is undertaking a bracing role. The same emphasis as for flat roof decking must be placed on correct conditioning, expansion gaps, design for condensation control, fixings, etc. In relation to its structural use, certain countries may have a National Annex and/or publish complimentary information to Eurocode 5. It is therefore the designer's responsibility to ensure compliance with relevant standards.

SMARTPLY® ROOF

SPECIFICATION & DESIGN

In order to avoid condensation on the underside of sarking panels, ventilation must be provided in addition to a correctly placed vapour control layer in accordance with established design guidance. Where sarking panels are used over a roofspace with insulation on a horizontal ceiling, the roofspace must be adequately ventilated from eaves to eaves, or with additional ridge vents or by means of a third party approved proprietary ventilation system. Where sarking panels are used over a 'room in the roof' with sloping ceilings and insulation between the rafters, there must be adequate ventilation space to the underside of the sarking over the insulation, ventilated from eaves to ridge, and a vapour control layer positioned on the warm side of the insulation.

Detailed recommendations for control of condensation are given in BS 5250 which now refers to EN ISO 13788 as the method of calculation (Glaser method), but due to the growing emphasis on airtightness and the thermal performance of buildings, SMARTPLY recommends more modern and advanced methods of hygrothermal simulation, as detailed in EN 15026.

- Non-bracing sarking (non-structural): For a particular set of conditions, defined in terms of design, load and environmental conditions, long-term experience has demonstrated compliance of the design with specified requirements. These designs are "deemed to satisfy" and Table 2 (below), which is extracted from the Wood Panel Industries Federations 'Panel Guide', provides the minimum thickness of OSB at certain support centres and is based on long-term experience:

TABLE 2: "Deemed to satisfy" minimum panel thickness (mm) for sarking (non-bracing):

Panel type	Rafter centres (mm)		
OSB/3	400 9	450 11	600 15

Note: Other thicknesses or spans may be appropriate where supported by calculated design.

- Sarking which has a bracing role (structural): It is possible for a structural engineer to calculate the effect of sarking using Eurocode 5 methods. Useful design guidance is available in PD 6693-1:2012 - Complimentary information for use with Eurocode 5.The recommendations given below are based on these standards.

Where the sarking panel acts as a structural bracing to the roof, thickness and rafter centres will be interdependent and related to the desired bracing design loads. Where the sarking panel is directly fixed to the top face of the rafter members, it may be permissible to omit the rafter diagonal bracing, chevron bracing and longitudinal bracing at rafter level, subject to structural design. This omission is acceptable only where specified by a structural engineer and where the sarking panel is moisture resistant and provides an equivalent level of restraint to out-of-plane instability and wind forces and therefore SMARTPLY OSB/3 or OSB/4 can be used. Care must be taken during erection to ensure that the stability, verticality and straightness of the rafters are maintained when the sarking is being installed.

The minimum thickness of OSB/3 sarking panel required to meet only the bracing requirements is 9mm, but this thickness is suitable only where roof coverings are independently supported on battens and secured to counter battens. In other pitched roof cases, it may be possible to attach roof coverings directly to the panel, subject to structural and hygrothermal design. Greater thicknesses or OSB/4 may be necessary to meet imposed loading and durability requirements. It is recommended to use 18mm under slates and for improved resistance to wind uplift.

Panel markings, sizes and availability for pitched roofing are similar to those given in the flat roof decking section of this technical datasheet. Guidance on expansion gaps, laying and fixing is provided later in this datasheet.

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TRANSPORTATION, STORAGE & HANDLING

Careful transportation, storage and handling are important to maintain panels in their correct condition for use. Precautions must be taken during storage, prior to delivery and on site to minimise changes in moisture content of the OSB panels due to weather.

Panels must be stored on dry bases, and packs must be evenly supported on bearers with spacer sticks at regular intervals (depending on panel thickness but max 600c/c).

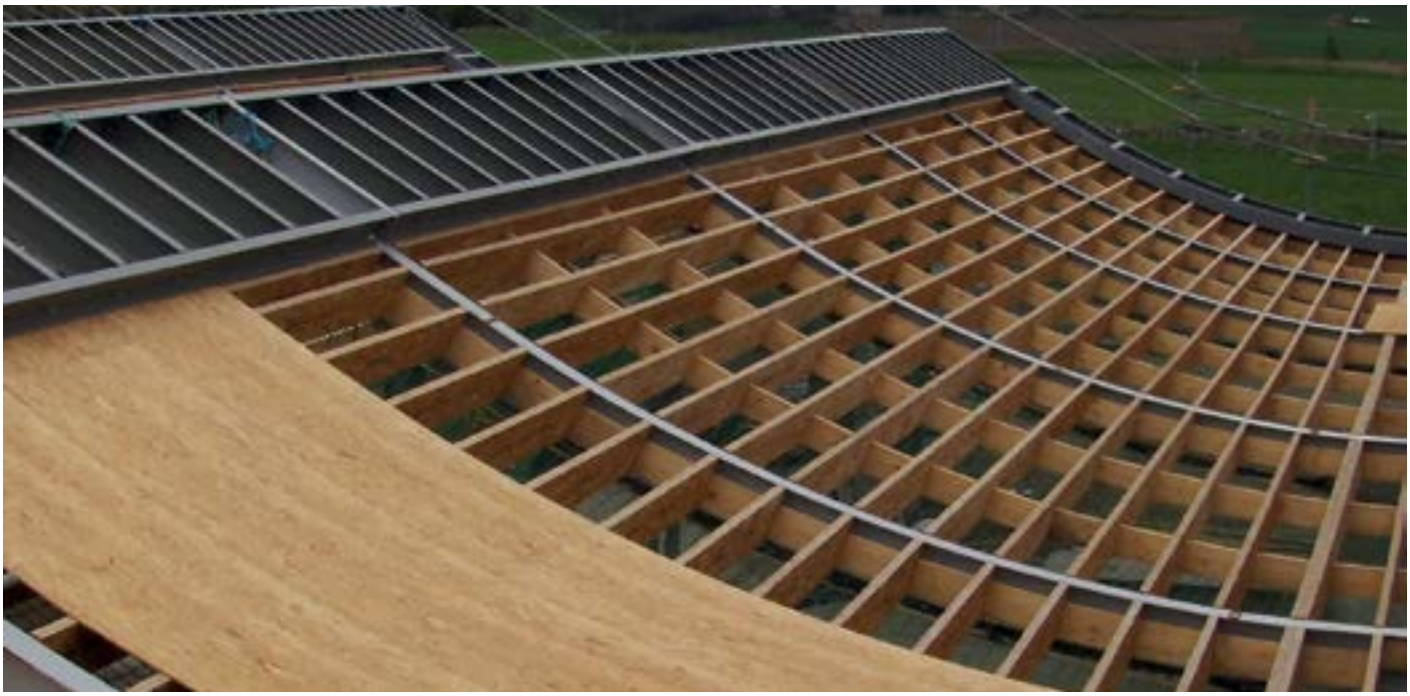
Packs should be sheeted with tarpaulins or other impervious material so arranged to give full cover, but at the same time to permit free passage of air around and through the pack. Care must be taken not to deform stacked panels. Bands should be cut as soon as practical and safe. During transport and handling it is particularly important to protect edges and corners with suitable coverings to prevent damage from chafing or slings. Where the roofing panels are required to have low moisture contents, it might not be possible to maintain suitable conditions on site other than for short periods, and deliveries must be arranged accordingly.

ASSEMBLY & ERECTION

The erection sequence and site storage must be planned so as to minimise the length of time that panels are left uncovered. In the case of prefabricated roof cassettes, lifting points must be clearly indicated and care needs to be taken during lifting to avoid distortion of the panels, straining of the fixings and joints and damage to edges.

Installed OSB/3 and OSB/4 panels can withstand short periods of temporary wetting during construction, although such exposure must be minimised as much as possible. Where greater moisture resistance is required, the use of **SMARTPLY SURE STEP DB** is recommended.

Temporary protection is recommended where panels are installed before the structure is adequately weatherproofed. Water must never be allowed to pool on the surface of panels, particularly at panel edges and T&G joints.
A squeegee is recommended to remove rainwater from panels in flat roof applications. Roof coverings must be installed as soon as possible to avoid prolonged exposure to direct sunlight.



SMARTPLY® ROOF

MOISTURE CONTENT

Moisture content of wood-based panel products varies in accordance with the moisture content of the surrounding environment and is affected primarily by the relative humidity (RH) of the surrounding air. It moves towards and maintains an equilibrium moisture content (emc), i.e. one that is in equilibrium with the surrounding air. This means that the moisture contents of the panel products will vary depending on the situation of use and with time as temperature and humidity conditions change. Although it is not possible to give precise levels, the figures in Table 3 (below) give a general indication of the range of moisture contents in wood-based panels in various conditions:

TABLE 3: Equilibrium moisture content & conditions of use (extracted from CEN/TR 12872)

Service class	Normal range of RH at 20°C	Approx emc	Conditions of use
1	30% to 60%	4% <_ emc <_ 11%	Dry installations, no risk of wetting in service
2	65% to 85%	11% <_ emc <_ 17%	Risk of wetting during installation and risk of occasional wetting in service

As required by EN 300, the ex-works moisture content of SMARTPLY OSB panels is in the range of 2 -12% (usually about 6%), depending on the type of panel. As recommended in BS 8103-3, the moisture content of panels at the time of erection or fixing must be no greater than 12%. As a guide, normally the moisture content ranges given in Table 4 (below) are encountered for various heating conditions.

TABLE 4: Typical moisture contents for various heating conditions (extracted from BS: 8103-3)

Unheated	15% to 19%
Intermittent heating	10% to 14%
Continuous heating	9% to 11%
Underfloor heating	6% to 8%

This indicates that unconditioned newly manufactured panels can increase in moisture content when installed in a building under construction and subsequently change in moisture content as the building is occupied, heated and dries out, with the consequence of dimensional changes. For guidance purposes it may be assumed that a 1% change in panel moisture content will cause a dimensional change in panel width, length and thickness as given in Table 5.

TABLE 5: Dimensional change for a 1% change in panel moisture content (extracted from CEN/TR 12872)

Panel type	Length %	Width %	Thickness %
OSB/3	0.02	0.03	0.5

CONDITIONING

To minimise dimensional changes, the roof panels must be conditioned in the service class for the intended use by loose laying or stacking with spacers as appropriate. The length of time allowed for conditioning will vary depending on the panel and the likely condition of use. A minimum period of 48 hours is required but a longer period of up to 1 week is necessary in more extreme conditions. Failure to adequately condition panels can result in buckling of the installed OSB panels.

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EXPANSION GAPS

The 'Moisture Content' section of this technical datasheet explains how wood-based panels experience dimensional change when subjected to changes in moisture content. It is necessary to allow for such movement by incorporating expansion gaps as follows:

- Perimeter, upstands and abutting construction: A gap must be left wherever panels abut any rigid upstand or abutting construction such as a perimeter wall, parapet walling, chimney, etc. This gap must be 2mm per metre length of roof but not less than 10mm wide. This gap applies where both square edge and T&G panels are used.
- Long roofs: On long roofs (above approximately 10-12m), it may be necessary to divide the area into smaller independent sections by incorporating intermediate expansion gaps. These gaps must allow for a possible overall expansion of 2mm per metre length of roof and applies where both square edge and T&G panels are used.

The spacing of these gaps depends largely on the type of roof and its design, i.e. flat, pitched, detached, terraced, commercial, etc. In order to simplify the installation of the panels, where possible these intermediate expansion gaps should coincide with other designed-in breaks in the roof plane, for example at party walls, fire breaks, structural movement zones, etc.

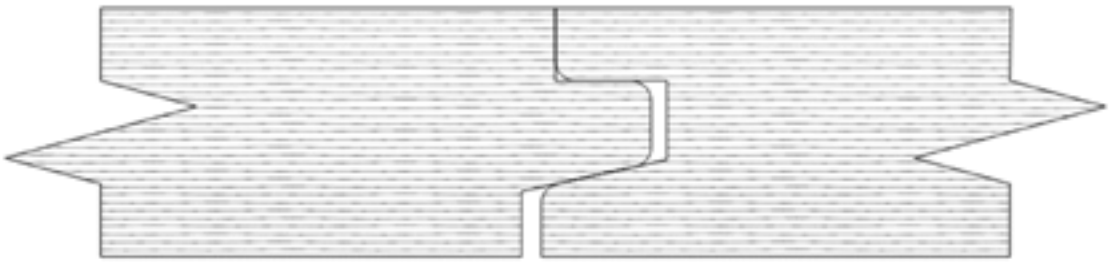
A sensible spacing for intermediate expansion gaps is 7200mm, i.e. every 3 panels where they are laid perpendicular to the rafters or every 6 panels where they are laid parallel to the rafters. This dimension also suits nominal framing centres of 400 and 600mm. It is important that the panels are installed in the direction of the design.

This guidance applies to thermal and moisture movements of the OSB only. Structural movement of the roof should also be accommodated if specified by the roof designer. Guidance on joints to accommodate structural movement of flat roofs is given in BS 6229.

- Between square edge panels: A 3mm gap must be left between all adjoining square edges of panels. It is essential that the gaps are kept free from plaster and mortar droppings and other debris during construction.
- SMARTPLY Tongued and Grooved OSB panels have an asymmetrical profile that has an expansion gap included, see diagram below. So the T&G edges must be butted together with the joints glued. the requirement for perimeter and intermediate expansion gaps still applies.

Depending on rafter width, extra rafters or noggins may be required to support panel edges and facilitate edge fixing of panels. Panels should have a minimum bearing of 17.5mm on rafters or noggins. Narrow rafters (<38mm) do not allow adequate edge bearing for square edge panels (due to the 3mm expansion gap required between panels) and for this reason, where rafter width is <38mm (for example 36mm TR26 timber used in trussed rafters), a double rafter or extra noggins will be required, or T&G4 panels should be used.

The above guidance is based on the requirements for expansion gaps given in BS 8103-3 and PD CEN/TR 12872 and SMARTPLY's long-term experience. However, it is recommended to calculate the specific expansion requirements for every roofing application taking both the moisture content during construction and the expected inservice equilibrium moisture content into account. Failure to leave adequate expansion gaps can result in buckling of the OSB panels.



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INSTALLATION

The area of decking / sarking installed in any working day must be no greater than can be quickly protected from wetting. Supporting rafters should be plumb, in line and to level. Rafters and noggins must provide adequate support for the panel edges in line with the design of the roof, as described above.

Timber rafters treated with water-borne preservative or which have high moisture contents must be dried to moisture contents less that 20% prior to fixing the OSB decking / sarking panels as the water can migrate from wet timber into the panels and may cause localised swelling.

SMARTPLY OSB roof panels have maximum strength and stiffness along the length (major axis) and are therefore laid to best structural advantage with the long edge spanning across the rafters. However, panels must be installed in the direction assumed by the design. Maximum strength and stiffness will be obtained if each panel is continuous over at least two spans between rafters. To facilitate ease of laying, panels are marked with laying direction arrows, indicating the major axis. Panels must be laid with the identification marks facing down.

For square edge panels, it is essential that panels are supported continuously along all edges by either rafters or noggins. For TG2 panels (T&G on the long edges only) both short edge must be supported by the centre line of a rafter or noggin but no support is necessary under the long edges set between correctly spaced rafters. T&G panel joints should be glued using a moisture resistant adhesive conforming to EN 204 grade D3 or D4 ensuring a snug fit with all T&G joints. This ensures a reliable distribution of strength, stiffness and spanning capacity along and across the panel. When using either square edge or T&G panels, joints along the short edges must be staggered and the panel length must not be less than two rafter spacings. Roof perimeter edges of panels which do not coincide with rafters must be supported on noggins.

FIXING

All panels must be fastened firmly to the supporting timber with flat head annular ringed shank nails 3.0-3.35mm in diameter (3.0mm diameter is preferable for≤38mm thick joists to reduce the possibility of splitting) or coutersunk head self-drilling wood screws 3.0-4.0mm in diameter can also be used (predrilling is advised if there is a risk of OSB or timber splitting).

All fixings should be a minimum of 50mm in length or 2.5 times the thickness of the panel, whichever is greater. In service class 2, fixings must be corrosion resistant.

Fixings should be spaced at 150mm centres along panel perimeters and at 300mm centres along intermediate supports. Fixings must be at least 10mm from the edge of the panel. In order to avoid buckling, fixings should commence at the top centre of the panel and continue outwards and downwards.

The above recommendations are a combination of those extracted from the ‘Manual for the design of timber building structures to Eurocode 5’ and based on SMARTPLY’s longterm experience. A structural engineer may specify different fixings requirements based on calculated design but such mechanical fixing must not excessively restrict the natural movement of the OSB panels.

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FINISHING

Flat roofs can be covered using traditional multi-layer finishes or proprietary single layer membranes. Reinforced bitumen membranes or mastic asphalt roofing should be installed as per the relevant product standard and industry best practices.Other built-up roof waterproofing systems can be used if covered by a current Agrément Certificate and laid in accordance with that certificate.

For pitched roofs with sarking, the tiling or slating should be fixed to tiling battens on counter battens with a tiling underlay. Counter battens must not be fixed to the sarking alone but should be fixed through the sarking panel into the rafters beneath.

The position of the underlay depends on its vapour resistance: if low (<5.7MNs/g) it can be laid directly on the sarking panel, under the counter battens; if high (>5.7MNs/g) it must be laid between the counter battens and tiling battens, forming a cavity to allow ventilation below the tiling underlay. This guidance is extracted from the Wood Panel Industries Federations 'Panel Guide', but SMARTPLY recommends that condensation risk should be assessed using modern and advanced methods of hygrothermal simulation, as detailed in EN 15026.

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QUALITY & ENVIRONMENTAL CERTIFICATION

SMARTPLY OSB is manufactured in accordance with the requirements of EN 300: Oriented Strand Boards (OSB) - definitions, classification and specifications.

SMARTPLY OSB is CE marked in accordance with the harmonised standard EN 13986: Wood-based panels for use in construction - characteristics, evaluation of conformity and marking. This standard is a technical specification for wood-based panels which implements the provisions of the Construction Products Regulation (CPR). In addition to the CE mark, SMARTPLY OSB panels are marked 2+ Structural for ease of reference. SMARTPLY OSB is UKCA marked in accordance with the designated standard BS EN 13986.

SMARTPLY OSB panels have technical agrements for Ireland from NSAI and in the UK from BBA. SMARTPLY OSB is UKCA marked in accordance with the designated standard BS EN 13986. Due to this certification it is permitted for structural use by Homebond (Ireland) and NHBC (UK) when used in accordance with the requirements of the Building Regulations in the country of use. Other quality certifications include KOMO (Netherlands).

SMARTPLY operates under an Integrated Management System (IMS) for Quality (ISO 9001), Environment (ISO 14001), Health and Safety (ISO 45001) and Energy (ISO 50001), which is certified by the National Standard Authority of Ireland (NSAI).

All SMARTPLY products are manufactured from Forest Stewardship Council® (FSC®) certified timber.

SMARTPLY operates under an Integrated Pollution Prevention Control (IPPC) licence, which is monitored by the Environmental Protection Agency (EPA) in Ireland.

All SMARTPLY OSB panels are manufactured using formaldehyde-free resin.

SMARTPLY® ROOF

NO ADDED FORMALDEHYDE

SMARTPLY OSB is manufactured using advanced resin technology that results in a high performance, no added formaldehyde panel. This specialist resin formulation provides a supreme bond with the wood strands as it has a reaction with the wood itself, when put under intense heat, creating a chemical weld. This is a different and superior type of bond to the mechanical weld that formaldehyde based products exhibit. Depth of penetration is well beyond the minimum 0.3mm needed for a wood resin to provide adequate adhesive strength. This extra resin penetration also greatly improves the wood's resistance to thickness swell.

EXPLORE OUR SMARTPLY RANGE

For quick reference, see below our table that highlights each product's features and benefits.

PRODUCT	OSB/3	OSB/4*	No added formaldehyde	Available in T&G	Certified Airtight	Low Slip Risk Coating	Pre-cut /Pre-rebated	Primed	Sound Reduction Compliance
SMARTPLY MAX	●		●	●					
SMARTPLY MAX DB	●		●	●					●
SMARTPLY ULTIMA		●	●	●					
SMARTPLY SURE STEP DB	●		●	●	●	●			●
SMARTPLY STRONGDECK		●	●	●					
SMARTPLY AIRTIGHT	●		●		●				
SMARTPLY PATTRESS PLUS	●		●				●		
SMARTPLY SITEPROTECT	●		●					●	

***OSB/4 is approximately 30% stronger and 20% more moisture resistant than OSB/3 making it more suitable for humid and heavy duty load -bearing applications.**

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For further information and/or technical advice please contact our dedicated customer service team.

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The recommendations provided in this technical datasheet for the correct use of SMARTPLY panels are specifically designed to ensure longevity and performance of this quality product in service. It is therefore essential that these recommendations are strictly followed.

The product is designed to be installed by a competent contractor, experienced with this type of product. **SMARTPLY EUROPE DAC** cannot be held responsible for damages arising from nonadherence to these recommendations, or product failures resulting from inadequate structural design or misuse of this product.

SMARTPLY EUROPE DAC cannot be held responsible for damages arising from non-adherence to these recommendations, or product failures resulting from inadequate structural design or misuse of this product.

In order to provide comprehensive guidance for the correct use of SMARTPLY OSB products, this technical datasheet makes reference to relevant BS and EN standards. SMARTPLY EUROPE DAC cannot be held responsible for claims arising from the use of any information that has been extracted from such sources.