SMARTPLY®
OSB4

SMARTPLY OSB4 is an extremely high-performance engineered wood panel suitable for the most demanding structural applications in offsite manufacturing and construction.
It is manufactured using state of the art ContiRoll® technology consisting of moisture resistant and formaldehyde-free bonding of wood strands, precision strand orientation and continuous pressing to produce large panels up to 2.8m wide by 7.5m long and to a maximum thickness of 40mm.

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SMARTPLY OSB4 is approximately 30-35% stronger and 20% more moisture resistant than OSB3 and is therefore a very cost-effective alternative in humid and high-load structural applications to a similar performing exterior structural plywood marked as "EN 636-3 S" (previously "WBP"[1]).

APPLICATIONS

- Offsite construction systems
- Panelised systems (timber frame; steel frame; SIP's)
- Volumetric 3D modular builds (Pods)
- Commercial buildings (e.g insulated infill panels)
- Industrial buildings (e.g Mezzanine flooring)
- 'Massive' OSB construction systems
- Hybrid construction (e.g. Cross Laminated Timber, CLT)
- Site-based construction (e.g. Insulated Concrete Formwork, ICF)
- Engineered timber components (e.g. roof cassettes; box beams)
- Industrial packaging (e.g. automotive; aeronautical)
- Decorative applications (bright, smooth surface)

ADVANTAGES OVER OSB3

- Heavy duty panel (approx. 30% increase in mechanical resistance)
- High load capacity (approx. 35% increase in bending strength)
- Higher moisture resistance[2] (approx. 20% reduction in thickness swelling)
- Higher vapour resistance[3]
- More airtight[4]

[1] Wrongly, WBP plywood remains a "market" term to describe exterior grade plywood. The term WBP (Weather Boil Proof) relates to the old standard BS 6566-8 that was withdrawn in 1998. The current EN 636-3 class has a glue bond requirement similar to the old "WBP". OSB3 & OSB4 must also pass glue bond performance tests in accordance with EN300.

[2] OSB4 with enhanced moisture resistance is not waterproof. The term 'moisture resistant' refers to the adhesive binder which will not break down in the presence of moisture (EN300 requirement). Prolonged physical wetting should be avoided.

[3] OSB is not a homogenous material (due to the nature of its wood strand orientation). Therefore vapour resistance values may vary slightly from panel to panel. While OSB4 has some vapour control properties, it cannot be relied upon as an effective vapour barrier. Hygrothermal assessment is recommended.

[4] OSB4 cannot be relied upon as an effective air barrier. For independently certified airtight OSB, please use SMARTPLY PROPASSIV.

FIGURE 1:
30% increase in mechanical resistance compared to OSB3

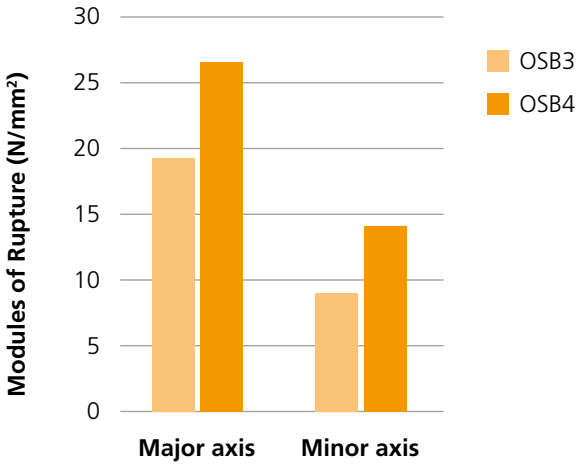
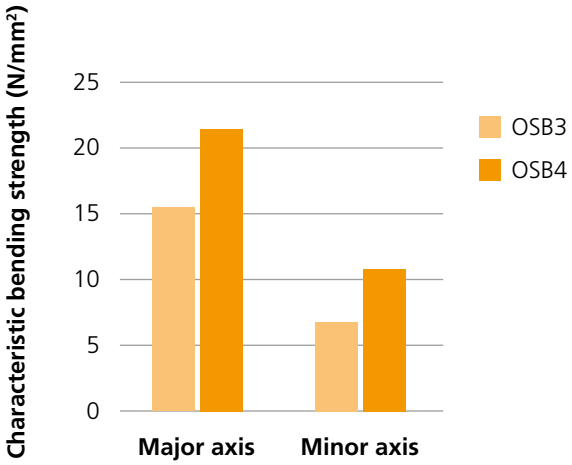


FIGURE 2:
35% increase in characteristic bending strength compared to OSB3



SUITABILITY:

EN 300 classifies OSB panels by their properties which relate to their intended use. SMARTPLY OSB4 is classified as follows:

- Heavy-duty load-bearing panel for use in humid conditions.

Structures comprising SMARTPLY OSB4 should be assigned to service class 1 or 2 as defined in EN 1995-1-1 (Eurocode 5). According to this standard, SMARTPLY OSB4 is suitable for use in both of these service classes.

Moisture conditions can affect the performance of wood-based panels. Therefore, it is important that the correct type of OSB is specified for a particular service class. 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 often exist. Consideration should also be given to end-use applications that may be at risk of prolonged exposure to the weather or standing water. Although OSB4 is more resistant to moisture than OSB3, this does not mean that the panel is waterproof. Please refer to SMARTPLY technical datasheets FLOOR, ROOF and FRAME for detailed installation guidance.

SMARTPLY accepts no liability for any damage or loss of strength caused by prolonged rain exposure during the construction process.

SPECIFICATION AND DESIGN

As design values can vary between manufacturers, it is important to ensure that the SMARTPLY OSB4 panels specified by the designer are those used on site. All SMARTPLY panels are clearly marked with the following information:

a Major axis (length of panel, direction of laying arrows)

b Production identification number

c Product Certification mark

d CE marking

- i. Manufacturer's name / Logo (SMARTPLY)
- ii. Notified body identification number
- iii. Quality standard (EN 300, EN 13986)
- iv. Panel type (e.g. OSB4)
- v. Thickness (e.g. 18mm)
- vi. Formaldehyde class (e.g. E1)

e Additional marking for ease of reference (e.g. 2+ structural)

f FSC® certification

Note: Markings may vary depending on product type.

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OSB4

SMARTPLY OSB4 - ZERO ADDED FORMALDEHYDE

SMARTPLY OSB4 is manufactured using advanced resin technology that results in a high performance, zero added formaldehyde panel that scores highly in 'The Green Guide to Specification' (see below).

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 0.3 mm needed for a wood resin to provide adequate adhesive strength. This extra resin penetration also greatly improves the wood's resistance to thickness swell.

SMARTPLY OSB4 AND 'THE GREEN GUIDE TO SPECIFICATION'

'The Green Guide to Specification' provides designers and specifiers with robust information to assist decision-making by translating numerical life cycle assessment data into simple A+ to E scale of environmental ratings, enabling specifiers to make the best environmental choices when selecting construction materials and components.

Specifiers using The Green Guide will be aware that OSB4, of which SMARTPLY is a market leading supplier, consistently scores well for overall environmental impact. Numerous examples are given in the guide where OSB4 contributes to an overall summary rating for elements of A and A+ and as a result consistently score better than those same elements in which plywood is specified.

SMARTPLY OSB4 has been independently assessed by NSAI for compliance to EN 13986:2004+A1:2015 and as a requirement by the Building Research Establishment's Environmental Assessment Method (BREEAM) under section 'Hea 02 Indoor Air Quality' can contribute towards a BREEAM rating / credit.

A Guide published by Greenpeace in August 2008, titled: 'Setting a New Standard: Alternatives to unsustainable plywood in the UK construction industry', has cited FSC certified Oriented Strand Board (OSB), of which SMARTPLY is a market leading supplier, as one of the most environmentally sound alternatives to non-FSC certified plywood for all manner of building projects.

TABLE 1:
Mechanical and physical properties of SMARTPLY OSB4

Mechanical properties	Test method	Unit	Requirements - EN 300				
Panel thickness	-	mm	6-10	11-17	18-25	26-32	33-40
Mean density tolerance	EN 323	%	+/- 15%				
Bending strength - major axis	EN 310	N/mm²	30	28	26	24	22
Bending strength - minor axis	EN 310	N/mm²	16	15	14	13	12
Modulus of elasticity - major axis	EN 310	N/mm²	4800	4800	4800	4800	4800
Modulus of elasticity - minor axis	EN 310	N/mm²	1900	1900	1900	1900	1900
Internal bond	EN 319	N/mm²	0.50	0.45	0.40	0.35	0.30
Internal bond - boil test	EN 1087-1	N/mm²	0.17	0.15	0.13	0.06	0.05
Swelling in thickness after 24h	EN 317	%	12	12	12	12	12
Formaldehyde release	EN 120	mg/100g	≤ 8.0 (E1)				
Moisture content - ex works	EN 322	%	2-12%				
General tolerances	**Test method**	**Unit**	**Requirements - EN 300**				
Length	EN 324-1	mm	+/- 3.0				
Width	EN 324-1	mm	+/- 3.0				
Thickness (unsanded)	EN 324-1	mm	+/- 0.8				
Thickness (sanded)	EN 324-1	mm	+/- 0.3				
Edge straightness	EN 324-2	mm/m	+/- 1.5				
Squareness	EN 324-2	mm/m	≤ 2.0				
Building physics calculation values	**Test method / Reference standard**	**Unit**	**Calculation value**				
Water vapour resistance factor (μ-value)	EN 12524 EN 13986	-	180 (wet cup μ) / 430 (dry cup μ) t = 12mm				
Reaction to fire (BS)	BS 476-7 AD B 2006	-	Class 3				
Reaction to fire (Euroclass)	EN 13501-1 EN 1398	-	(≥ 9 mm) D-s2,d0 (excluding floorings) (≥ 9 mm) DFL-s1 (floorings)				
Charring rate (β0,ρ,t)	EN 1995-1-2	mm/min	(≥ 20 mm) 0.78				
Thermal conductivity (y)	EN 13986	W/(m.K)	0.13				
Airborne sound insulation	EN 13986	dB	R = 13 x lg (m_A) + 14 : (1-3 kHz at m_A >5 kg/m²)				
Sound absorption coefficients	EN 13986	-	0.10 (frequency range 250 Hz to 500 Hz) 0.25 (frequency range 1000 Hz to 2000 Hz)				
Dimensional change at 1% change in panel moisture content	EN 318 DD CEN/TS 12872	%	Length 0.02		Width 0.03		Thickness 0.5

SMARTPLY® OSB4

STRUCTURAL DESIGN OF SMARTPLY OSB4

BS 8103-3 provides "deemed to satisfy" tables and other structural design guidance to enable supervisory/technical staff of building companies to determine the thickness, type and any limitations of OSB components for floors and roofs of dwellings of limited size. A structural engineer should be employed where the building falls outside the scope of this part of BS 8103. Further technical guidance is provided in the relevant SMARTPLY product technical data sheets.

Characteristic values for strength and stiffness of OSB4 are given in Table 2 (below). These can be used for limit state designs to EN 1995-1-1 (Eurocode 5). The properties listed include bending, tension, compression and shear.

When OSB4 is used structurally under service class 1 conditions, the characteristic values of the structural properties given in Table 2 shall apply. To convert these values into design values they should be modified according to EN 1995-1-1 (Eurocode 5) for duration of load (kmod, kdef).

When OSB4 is used structurally under service class 2 conditions, the characteristic values of the structural properties given in Table 2 shall apply. To convert these values into design values they should be modified according to EN 1995-1-1 (Eurocode 5) for both service class and duration of load (kmod, kdef).

TABLE 2:
Characteristic values for strength and stiffness of OSB4:

Properties	Designation	Thickness range (mm)		
		>6 - 10	>10 – 18	>18 - 25
Characteristic Strength Properties (N/mm²)				
Bending strength				
Parallel to span	$f_{m,0,k}$	24.5	23.0	21.0
Perpendicular to span	$f_{m,90,k}$	13.0	12.2	11.4
Tensile strength				
Parallel to span	$f_{t,0,k}$	11.9	11.4	10.9
Perpendicular to span	$f_{t,90,k}$	8.5	8.2	8.0
Compressive strength				
Parallel to span	$f_{c,0,k}$	18.1	17.6	17.0
Perpendicular to span	$f_{c,90,k}$	14.3	14.0	13.7
Shear strength				
Panel shear	$f_{v,k}$		6.9	
Planar shear	$f_{v,r,k}$		1.1	
Stiffness Properties (N/mm²)				
Modulus of elasticity				
Mean, in bending parallel to span	$E_{0,mean}$		6780	
Mean, in bending perpendicular to span	$E_{90,mean}$		2680	
Mean, in tension and compression parallel to span	$E_{ct,0,mean}$		4300	
Mean, in tension and compression perpendicular to span	$E_{ct,90,mean}$		3200	
Shear modulus				
Panel	$G_{v,mean}$		1090	
Planar	$G_{r,mean}$		60	

Notes:
- 0 = in the direction of the major axis.
- 90 = in the direction of the minor axis.
- These properties relate to an equilibrium moisture content of the test pieces conditioned at a temperature of 20°C and a relative humidity of 65%.
- The 5th percentile characteristic values for stiffness should be taken as 0.85 x the mean values given in the table.

SMARTPLY® OSB4

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.

Other quality certification includes KOMO (Netherlands).

SMARTPLY has achieved I.S. EN ISO 9001, the internationally recognised quality management system which is certified by the National Standards Authority of Ireland (NSAI).

SMARTPLY has Forest Stewardship Council (FSC) Chain of Custody certification for its manufacturing, processing, sales and distribution processes.

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

All SMARTPLY OSB4 products are manufactured using formaldehyde-free resin.

SMARTPLY®
OSB4

SERVICE

For further information and/or technical advice please contact your local SMARTPLY Sales Representative or SMARTPLY Technical Support Personnel through any of our European offices.

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As we continually update our technical datasheets, please check on **www.mdfosb.com** that you have the latest version.

IMPORTANT NOTES

The recommendations provided in this technical data sheet for the correct use of SMARTPLY OSB4 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 general builder or contractor, experienced with this type of product, in strict accordance with the technical guidance provided in the relevant SMARTPLY product technical data sheets.

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 OSB4, 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.

FSC www.fsc.org FSC® C019668 The mark of responsible forestry

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CE

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INNOVATIVE TIMBER PRODUCTS