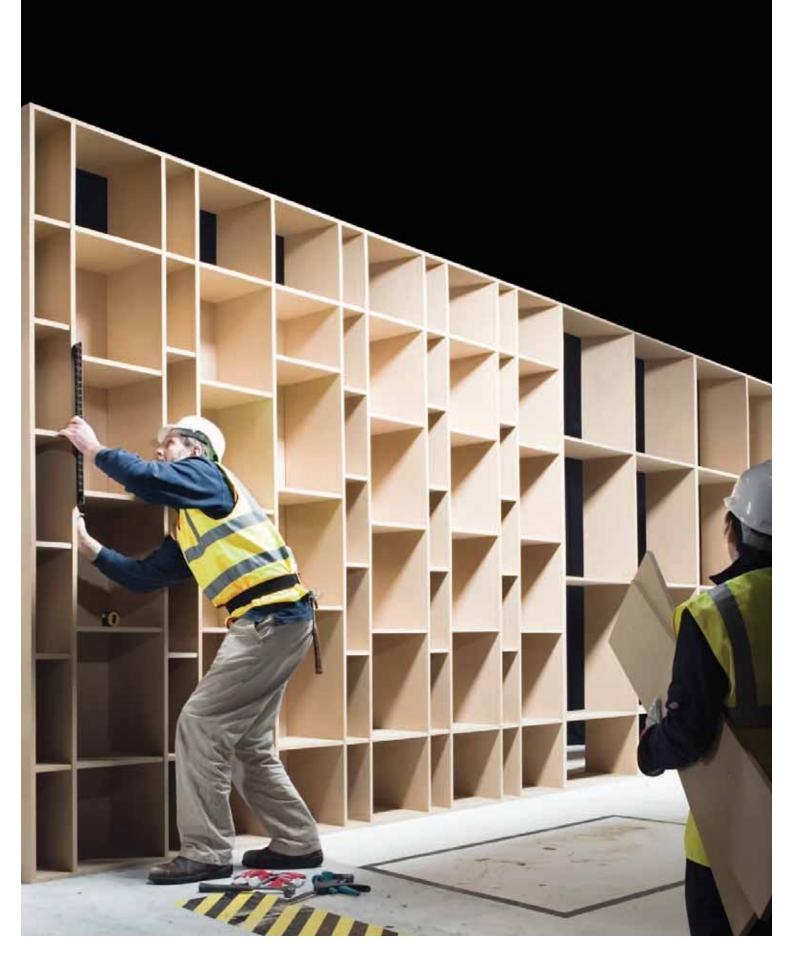




www.norbord.com



About Norbord

Norbord is one of the World's leading manufacturers of engineered wood-based panel products. Our products are used extensively in the construction, furniture and DIY sectors.

Norbord's success comes from the pursuit of excellence in all areas. This is a key driver within Norbord and is integral to how we manage our business. Across all functions we aim to deliver the highest level of achievement as standard.

The result is a company that is responsive with dependable and dedicated customer service without compromising safety or the environment.

Norbord is committed to sourcing all of its timber from responsibly managed forests. All of our European manufacturing facilities have the capacity to produce products certified to Forest Stewardship Council standards.

The FSC product label allows consumers worldwide to recognise products that support the growth of responsible forest management. In an increasingly environmentally aware marketplace, many demand the FSC mark on their wood products. With Norbord it comes as standard.

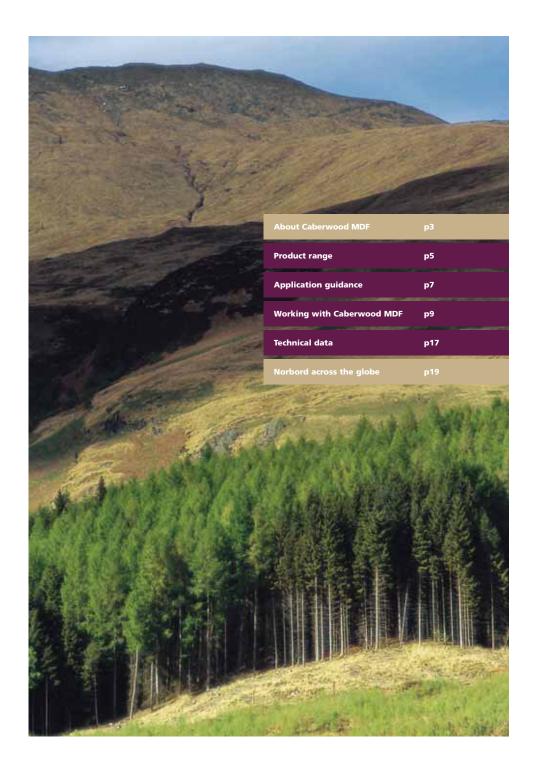
OUR VALUES



EXCELLENCE







About Caberwood MDF

Norbord has the distinction of owning the World's first site to manufacture MDF. This pioneering development began back in 1966 at our facility in Deposit, New York State. Later in 1979, our Cowie facility was the first to produce MDF in the UK.

Today, MDF is one of the most popular materials used in the furniture and construction industries. Norbord continues to be a leader in MDF production and development.

Caberwood MDF is designed to exacting tolerances, to give you peace of mind that the product you are using is engineered to perform.



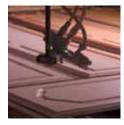
Investing in the next generation

Although we were the first MDF manufacturer in the UK, we are never complacent. This means constantly looking at improving our manufacturing process – by investing in plant, energy conservation and new product development.

So when you specify Caberwood MDF you know you are buying a product that is the best it can be.









Product range

Ultralight & Light

Caberwood Ultralight is 31% lighter than standard MDF, providing a weight saving of 10kg per 8x4 sheet. This low density board is ideal for theatre scenery, film sets and exhibitions.

Caberwood Light MDF is up to 20% lighter than Standard MDF.

- Economical
- · Environmentally friendly
- E1 low emission resin binders
- · Opens up new design possibilities
- · Prolongs life of tools and equipment

Ideal for many applications where weight is a design requirement, such as shopfitting and caravan manufacture.

Standard

Caberwood Standard MDF is used extensively throughout the construction and furniture industries. With excellent surface properties and consistent qualityits reputation is second to none.

- · Incredibly versatile
- E1 low emission resin binders
- High internal bond strength
- · Superior holding of screws and fasteners

Suitable for all types of machining and surface finishing.

Product range

Moisture Resistant

Caberwood Moisture Resistant MDF is designed for interior applications that may be subject to occasional wetting or exposure to humidity. All the desirable properties of Caberwood standard are enhanced with the additional benefits of:

- Suitable for humid environments
- Excellent stability in damp conditions
- Good machining characteristics

Typically used for kitchen and bathroom furniture, window sills, skirting boards and door architraves.

Deep Rout Grades

Caberwood Deep Rout MDF offers a high level of performance when being used with wood–working tools. Caberwood Deep Rout Excel is the ultimate MDF, ideal for advanced routing, allowing more complicated profiles to be cut.

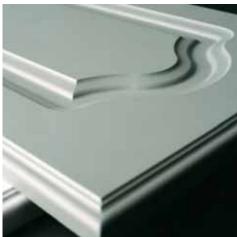
- Excellent machining characteristics
- Outstanding paint finishes
- Minimum surface preparation

Typically used for bedroom and kitchen doors and also where a high gloss PVC finish is required.







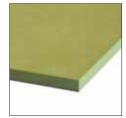


Application guidance

The following table provides general guidance. For advice on the best product for your specific application, please contact Norbord customer services or technical support on +44 (0) 1786 812921.

Product sp	ecification*			Applio	ations		
Product	ct Thickness 80 Range (mm)** Iouery		Simple designs with minimal profiles	High humidity	Deep routed profiles (e.g. membrane pressed PVC doors)	Designs with advanced deep routed profiles and painted finishes	Architectural mouldings – skirting architraves
Ultralight	12 - 25	V					
Light	12 - 25	~	V	Depen	ding on specifi	cations	V
Standard	6 - 38	~	V				V
Moisture Resistant	6 - 30	~	~	~			V
Deep Rout Grades	15 - 25	~	~		~	~	V

^{*} Design criteria can vary significantly depending on specifications, the equipment you are using and the finish you intend to apply. The above table provides general guidance only. It is recommended that you conduct small scale pilot tests to ensure you have the correct grade for your end use.





Caberwood MDF Moisture Resistant Caberwood MDF Standard



^{**} Other thicknesses are available on request.

[✓] Suitable

Working with Caberwood MDF

Profiling

Profiled edges require no edge banding or lipping. Sculptured or textured effects can be machined or embossed, and narrow or small door frames can be produced from a single piece of board. Caberwood MDF has a smooth surface that is ideal for painting, grain printing or the application of paper foils and veneers. In many respects Caberwood MDF can be treated as a high quality timber, but without the inherent defects of knots and grains.

A major advantage of Caberwood MDF is the relative ease of finishing perpendicular and moulded edges without the need for elaborate filling or the application of adhesive bonded edging materials. This characteristic derives from the uniform density of Caberwood MDF, and the absence of core voids which would require filling.

Sanding

Sanding after moulding or routing produces a much smoother finish. The moulded edges can be sanded with any number of different profile sanders. Various polyurethane based abrasive wheels are available to fit to spindle moulders or in line with a double end tenoner. These wheels can be shaped to the cutter profile using an abrasive paper glued to the desired edge profile. 80/100 grit should be used for the removal of cutter marks. 120/150 grit is usually used for finish sanding with finer grades available, if required.







Working with Caberwood MDF

Machining

Caberwood MDF is a homogeneous wood fibre material ideally suited to modern a longer tool life: machine tooling.

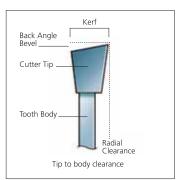
Caberwood MDF can be worked easily with all conventional woodworking machines. It saws cleanly and drills easily. It also shapes and routs exceptionally well, without splintering or chipping. Caberwood MDF is equally suited for use with most hand tools.

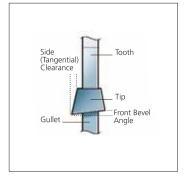
Sawing

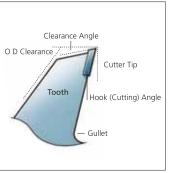
Follow these tips to ensure best results, minimum breakout and

- Tungsten carbide saws are recommended for general use.
- Saw blades should have higher clearance angles and increased tool angles compared with normal wood-working saws.
- Clearance angles should be maintained when the saw is serviced. Reduced angles will increase the amount of resin build up. Increased angles will reduce the life between sharpening.
- Chipload which is the thickness of chip cut by each tooth - should be in the range of 0.15 to 0.25mm. The feed rate required to produce this is calculated as follows:

Feed rate (mm/min) = Chipload x r.p.m. x no. of teeth







Advice on fixing

Mechanical joints and fixings

Mechanical fittings developed for use with particleboard can be applied to MDF with the following recommendations:

- Wherever possible select fittings that depend upon face fixing.
- Avoid fittings which depend upon the expansion of a component inserted into the board edge.
- When using screws follow the pilot hole dimensions recommended below.

Screwing

The internal bond strength of Caberwood MDF gives substantially better screw holding over other types of panel product.

Type of screw

Most types of screw can be used. Best results are obtained with parallel thread screws. A high overall diameter to core ratio is desirable.

Positioning

Screws which are inserted into the face should not be less than 25mm from the corners. Screws inserted into the edge should not be less than 70mm from the corners. Do not over tighten screws as further turning after screws are tight will reduce the holding power.

Pilot holes

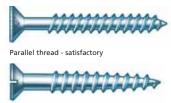
Larger diameter pilot holes than those recommended for solid wood and particleboard are required in faces and edges of MDF to accommodate the core of the screw. For GKN Superscrews the recommended pilot diameter should be 85% to 95% of the screw core diameter.

Screw for panel jointing

This requirement is particularly important when screwing into the edges of thinner boards. Pilot holes should be drilled approximately 1mm beyond the expected depth of insertion of the screws into the board.



Screw for fixing thin attachments



Traditional woodscrew - less satisfactory

Nailing and stapling

Where other methods of fixing are not practical, Caberwood MDF can be fixed with nails. Nails should be spaced 150mm apart to reduce the risk of splitting and at least 70mm from the corners. Nailing the edges of 9mm and 12mm Caberwood MDF is not recommended because of the risk of splitting.

Caberwood MDF can also be fixed using staples. For best results staples should not be inserted closer than 12mm from the edges and 25mm from the corners. This fixing method is only recommended for applications involving light loads. Close spacing of the staples is acceptable but the legs should be aligned at an angle of 15° to the plane of the board.

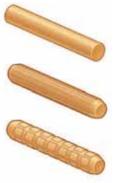
Dowel joints

Dowel holes should be machined with a sharp tool so that the surfaces are free from loose fibre. All dust should be removed prior to assembly. The dowel hole diameter should be slightly larger than the dowel. This will allow good adhesive cover and avoid splitting of the edge.

Dowels with multiple longitudinal or spiral groove patterns ensure uniform adhesive spread within the joint. For best results dowels should be given a total glue coverage. Adhesives such as Polyvinyl Acetate (PVA) or Urea Formaldehyde are preferred as they have good gap filling properties, and their high solid content counteracts absorption of adhesive into the machined edges of Caberwood MDF.







Smooth dowels are not recommended, grooved dowels are preferred

Adhesive bonded joints

Wall panels

A wide variety of jointing methods can be adopted providing the following simple guidelines are observed:

- · The joint parts should be accurately machined.
- Sharp cutters should be used to avoid tearing or burnishing of surfaces to be bonded.
- A high solids content adhesive with gap filling properties should be used. (Polyvinyl Acetate or Urea Formaldehyde).
- Mating pieces should be accurately located and held under pressure while the adhesive is setting.
- The width of grooves machined in Caberwood MDF should be limited to about one third of the thickness of the board.
- The depth of groove should be about one half of the board thickness.
- Adhesive bonded joints should be allowed to condition for several days before sanding and finishing to avoid the appearance of sunken joints. This treatment is essential when using high gloss finishes.
- A tongue and groove joint is very efficient, provided the fit of the joints is not too tight as this may cause a split along the edge.
- When attaching lippings the tongue should be machined on the solid wood piece.

Caberwood MDF can be fixed using conventional dry lining techniques. For best results, follow these recommendations:

- Before fixing, condition the board for a minimum of 24 hours in the area of use.
- An expansion gap of 10mm or 2.5mm per metre (whichever is the greater) must be allowed, on length and width.
- Gaps are normally left as 'feature gaps', or they may be concealed by a suitable cover strip.
- Provision should be made to ventilate the side fixed to battens.
- Fix boards to supports with screws as specified at 200mm intervals,
 25mm from edges. Screw length should be 2.5 times board
 thickness. Use 400mm centres for boards of less than 12mm.

Advice on laminating

Paper foils

The smooth, stable surface of Caberwood MDF makes it an ideal substrate for surfacing with decorative paper.

Flat platen presses developed for wood veneering are normally used for bonding heavier weight foils (80g/m² and higher). Short cycle platen presses and hot roller laminators are normally used for medium and lightweight foils. Adhesive coating weights in the range 80-100g/m² are typical for heavyweight foils and 60-80g/m² for medium and lightweight foils.

PVC foils

PVC foils are normally bonded at room temperature in a roller laminator using copolymer dispersions or epoxy adhesives. The panels emerging from the press should be stacked on a flat base for several hours to allow the bond to achieve full strength before further processing.

Heat transfer foil

Heat transfer foil can be applied to Caberwood MDF by a simple one-step drying process. When wood grain foil has been applied to a surface, a coat of lacquer can be applied by conventional methods to provide additional protection.

Resin impregnated papers

Melamine resin impregnated papers can be laminated to MDF by following the same procedures adopted for Melamine faced particleboard.

Wood veneering

The smooth surface of Caberwood MDF provides a suitable substrate for the application of wood veneer using Urea Formaldehyde (UF) or Cross Linked Polyvinyl Acetate (PVA) adhesives as the bonding agent. The close thickness tolerance on Caberwood MDF ensures uniformity of pressure over all panels in a press load.

Facing and backing veneers must have approximately equal thickness and moisture content to ensure flatness. Wood veneered Caberwood MDF panels should be stacked flat and allowed to cool for a minimum of 8 hours before further processing.

Choice of adhesive

Caberwood MDF can be joined with excellent results with most commercial brands of adhesives available to the Furniture and Joinery Industries. The choice of a specific type of adhesive will be determined by the surface characteristics of the other materials being bonded to the MDF. Consult your individual adhesive suppliers for more detailed specific information.

Adhesive data

	Polyvinyl Acetate	Urea Formaldehyde	Neoprene	Copolymer Dispersion	Epoxide	Hot Melt	Polyurethane Solvent Based	PMDI
Wood Veneering	V	~			~	V		
Plastic Laminate Veneering	V	V	~		V			
Paper Foil Laminating		V		~				
PVC Foil Laminating				V	V			V
Edge Lipping or Banding	V	V			V	V		
Assembly Jointing	V	V			V	V		
Veneer Foil Wrapping	V					V	V	

✓ Suitable







Mitre joints between Caberwood MDF panels

Advice on sealing and painting

The smooth surface of Caberwood MDF makes it suitable for successful finishing with a wide range of coatings.

Alternatively, the natural appearance of the MDF surface can be enhanced using a transparent stain with a clear lacquer topcoat. High gloss or matt finishes can be achieved. The selection of the finishing system, on the basis of chemical type will depend on the scale of production, application equipment, drying facilities and the expected performance of the finish in relation to the conditions of use. Modern combined systems are possible, e.g. u.v. sealers, basecoats / a.c. (acid catalysed) topcoat.

The surfaces to be finished should be free from dust or sanding marks. Caberwood MDF is suitable for most matt finishing treatments without further sanding. An additional light sanding with 180/220 grit is recommended when using high gloss finishes or where a minimum coating thickness is required. High absorption of lacquer or paint into the machined edges of MDF can be prevented by the application of an appropriate sealer such as shellac, polyurethane diluted polyvinyl acetate (PVAC) or specially formulated high solids sealers based on two-component catalysed resins. Edge sealing is recommended. The sealed edges can be stained if required, and then finished with one or two coats of clear or tinted lacquer to match the finish on the surface.

Environmental credentials

Forest Stewardship Council

Norbord is committed to sourcing all of its timber from responsibly managed forests and therefore all of our European manufactured MDF products are certified to Forest Stewardship Council standards.

The FSC product label allows consumers worldwide to recognise products that support the growth of responsible forest management. In an increasingly environmentally aware marketplace many demand the FSC mark on their wood products: with Norbord it comes as standard.

At Norbord, all of our facilities are regularly visited by a team of environmental auditors, so there is always something better to strive for and a new standard to set. This combines with our open approach to business. Norbord is a name you can trust to deliver, and to keep its promises.

Investing in the environment

Norbord has invested heavily in environmental improvements since 1995. This includes aircleaning technology such as state-of-the-art WESPS (wet electrostatic precipitators). It also means investment in recycling facilities. We can generate as much as half our mill's energy needs by using wood residues as fuel – composting what is left.

By reusing and conserving, we safeguard the environment and keep our costs down. In turn, our products are good for the environment and also good for your budget.

All of our plants have obtained the coveted environmental ISO 14001 accreditation. The ISO 14000 family addresses environmental management. This means what the organisation does to:

- minimise harmful effects on the environment caused by its activities, and to
- achieve continual improvement of its environmental performance





For information and advice on suitability of paints and lacquers contact the following:

FIRA

Furniture Industry Research Association www.fira.co.uk

SDF

Scottish Decorators Federation www.scottishdecorators.co.uk

PDA

Painting and Decorating Association www.paintingdecoratingassociation.co.uk







Technical data

	Unit	١	Ultraligh	t	Light	;	Standard Moisture Resistant					Deep Rout	Deep Rout Excel
Thickness	mm	12	15	18	12/15 18/22	>6-12	>12-25	>25	>6-12	>12-25	>25	12/15/18 22/25	12/15/18 22/25
Thermal Conductivity 'K' value	W/m.K	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Internal Bond	MPa	0.25	0.25	0.25	0.5	0.7	0.7	0.7	0.85	0.85	0.85	0.9	0.9
Modulus of Rupture	MPa	8	8	7	20.0	60.0	45.0	40.0	60.0	45.0	40.0	45.0	45.0
Modulus of Elasticity	MPa	750	750	700	2500	5000	4000	3500	5000	5000	5000	5000	5000
Thickness Swelling (24hr)	%	18	14	13	12	11	8	7	10	5	3	8	8
*Dimensional Stability 65%-85% Length	mm/m	0.25	0.25	0.25	0.25	0.3	0.2	0.2	0.3	0.2	0.2	0.2	0.2
*Dimensional Stability 65%-85% Thickness	mm/m	0.4	0.4	0.4	4.0	5.0	4.0	4.0	5.0	4.0	4.0	4.0	4.0
Screw Holding Edge	N	NA* ²	NA*2	NA*2	750	NA	1000	1000	NA	1000	1000	1000	1000
Screw Holding Face	N	552.5	552.5	552.5	650	NA	1250	1250	NA	1250	1250	1250	1250
Moisture Content (ex plant)	%	5-9	5-9	5-9	5-9	8 ± 3%	8 ± 3%	8 ± 3%	8 ± 3%	8 ± 3%	8 ± 3%	8 ± 3%	8 ± 3%
Reaction to fire	EN 13501-1	Class D	Class D	Class D	Class D	Class D	Class D	Class D	Class D	Class D	Class D	Class D	Class D
#Total Extractable Formaldehyde	mg/100g	≤8.0	≤8.0	≤8.0	≤8.0	≤8.0	≤8.0	≤8.0	≤8.0	≤8.0	≤8.0	≤8.0	≤8.0

Values are typical values in accordance with EN standards, EN 622-5 for Fibreboards: Specification – Part 5: Requirements for dry process boards (MDF).

* Dimensional Stability – a typical change in humidity is shown (BS EN 318) 65% r.h. - 85% r.h. (or vice versa) with the corresponding change in length and width as a %. 85% r.h. is a humidity to simulate a damp environment. BS EN 318 'Fibreboards - Determination of dimensional changes associated with changes in relative humidity.'

*2 It is not recommended to fix into the edge of Ultralight MDF.

Determined using BS EN 120.

Thickness tolerance for all grades is:

- ± 0.2mm ≤ 22mm ± 0.3mm > 22mm

All Caberwood MDF products conform to the latest European low emission standards 'E1'. 'E1' signifies coated and uncoated MDF panels which characteristically give ≤8mg/100g formaldehyde when tested in accordance with BS EN 120.

Caberwood MDF Panel Weight Guide

For lifting & handling purposes using an 18mm panel thickness, the following should be used as a guide weight (kg per m²).

Caberwood MDF Light
Caberwood MDF Standard / Moisture Resistant
Caberwood MDF Deep Rout / Deep Rout Excel 13 kg/m² 14.5 kg/m²

10 kg/m²

Note: Calculations for guide weights for thicknesses other than 18mm, are pro-rata, e.g. 12mm Caberwood MDF Light = 10 kg/m² x $12/18 = 6.7 \text{ kg/m}^2$.

Boards per pack

Board Size	6	9	12	15	16	18	19	22	25	28	30	36	38
2440 x 1220mm	96	76	60	48	44	40	37	32	32	28	24	20	20
2440 x 1525mm	92	70	56	45	41	30	35	30	24	18	22	16	18
2440 x 1830mm	76	60	48	36	34	30	29	24	24	21	18	16	15
3050 x 1220mm	78	60	48	36	36	30	30	26	24	20	18	16	15
2745 x 1220mm	87	64	53	42	39	36	33	29	25	23	24	18	17
3660 x 1220mm	62	48	36	28	26	24	30	26	24	21	20	15	15

Transport and storage

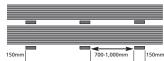
Caberwood MDF should be:

- Transported in uniform stacks on a flat base to avoid damage;
- Protected against the weather; on request. · Stored on a rigid flat base and
- adequately ventilated; • Insulated from the ground to avoid dampness.

When wooden battens are used they shall be of uniform thickness and placed in line. The distance between battens should be no greater than 700-1,000mm.

An HSE information sheet on the 'safe stacking of sawn material and board materials' is available





Correct method of edge stacking

Correct method of storage on battens



Norbord across the globe

Norbord across the globe

Norbord is one of the World's leading manufacturers of engineered wood-based panels. With our headquarters in Toronto, we employ some 2,700 people worldwide with approximately 1,200 of them in Europe. We are publicly owned and listed on the Toronto Stock Exchange.

Our facilities include

- 11 OSB mills • 2 MDF plants
- 2 particleboard plants
- 1 speciality plywood mill
- 1 furniture plant

Particleboard

The result is a successful company built on integrity, listening to our customers and always improving the way we work.

Industry sectors served

Our products are used extensively in the construction, furniture and DIY sectors. From tongued and grooved Caberfloor ideal for flooring solutions, to structural SterlingOSB designed to withstand the rigours of I-joists, all our products are manufactured to vigorous quality standards.



Norbord in Europe and quality credentials

In Europe, we have four sites CE Marking

Cowie, Scotland Tel +44 (0)1786 812921 Fax +44 (0)1786 815622 Caberwood MDF Caberboard Caberfloor

Inverness, Scotland

Caberdek

Tel: +44 (0)1463 792424 Fax: +44 (0)1463 791764 SterlingOSB2 SterlingOSB3 Sterling Roofdek

• South Molton, England Tel: +44 (0)1769 572991 Fax: +44 (0)1769 572413

Conti Caberboard **Furniture Components**

• Genk, Belgium

Tel: +32 (0)89 500300 Fax: +32 (0)89 362971 SterlingOSB Conti

The CE mark (from the French, 'Conformité Européan') is intended to promote the free movement of products within the EU by showing that essential health and safety requirements have been met.

The CPD (Construction Products Directive) applies standards to the finished works into which construction products are to be used, rather than applying directly to the products themselves. These quality standards ensure that:

- The product has been subject to an appropriate system of attestation of conformity with one or more technical
- The product does in fact conform with the relevant aspects of the identified technical specifications; and

specifications;

• Therefore, the product is fit for its express intended use or with its implied range of suitable uses.







South Molton England



Genk Belgium



Values and beliefs

The people of Norbord Europe have adopted a common set of values which have been built through open communication and dialogue reflective of mutual respect. They can be summarised in three words:







Commitment to helping our customers be successful

Our people recognise that if our customer relationships are not based on win-win outcomes, then they are not sustainable.

This belief drives our strategy of focusing on key customers and working with them to ensure mutual benefits over the long term. Benefits based on continuing improvements in customer service, product and business development, supply chain effectiveness and technical support.

The only valid gauge of our success in this commitment, is whether our customers believe and say we're doing it.

Trust and personal responsibility in all relationships

We believe that each of our people has the capability and commitment to maximise his/her contribution and the desire to take responsibility for their actions

Our collective goal is to set clear objectives and to deliver on all promises and commitments. This philosophy applies whether we're engaged with customers, suppliers, fellow members of Norbord, shareholders, or with the community at large.

Excellence as our standard

Our goal is to have an organisation which is capable of excellence and of delivering it consistently in the areas critical to our business.

These include the following:

- Safety
- Managing beyond customer expectations
- Supply chain management Cost management
- Capacity assurance
- Organisational effectiveness

Customer support

Logistics

At Norbord, we run our own specialist logistics service. A service known for its reliability: a service that guarantees availability.

Available to selected accounts. our unique Fastrack quarantee goes even further.

How Fastrack can work for you:

- Assured supply
- Direct delivery to your customers
- One order point for all products MSDS
- Improved stock turnover

Our range of logistical options adds up to on time and in full delivery.

Technical support

At Norbord, our experienced technical team is on hand to deal with enquiries from architects. builders, contractors - in fact anyone involved in the specification or use of Norbord's engineered wood-based panels.

Rest assured - our commitment will continue throughout your project and beyond.

Material Safety Data-Sheets are available for all Norbord products. Please contact Norbord Technical Support or visit www.norbord.com

Training

For many years Norbord's technical sales personnel have been providing training aimed at improving the knowledge and skills of:

- Construction professionals Specifiers
- Merchant and distribution staff
- Technical support staff
- Sales personnel

As a member of the Construction CPD Certification Service, you can be safe in the knowledge that Norbord's training is amongst the best in the industry.









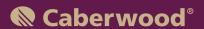














Norbord Ltd, Station Road, Cowie, Stirlingshire, FK7 7BQ Tel +44 (0)1786 812921 Fax +44 (0)1786 815622 info@norbord.net

