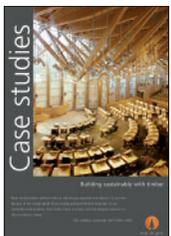
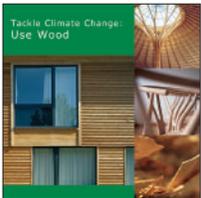
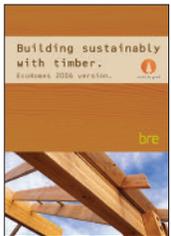
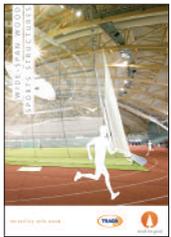




the builder's guide  
to timber in joinery.



wood. for good.



wood for good is a generic wood campaign sponsored by The Swedish Timber Industry, the Forestry Commission, ConFor (The Confederation of Forest Industries) and the Northern Ireland Forest Service. All members are committed to sustainable forest management. In each of the members' countries credible third party certification schemes are now operating and increased areas of forest are being certified.

Visit [www.woodforgood.com](http://www.woodforgood.com) for more information and for details of seminars, exhibitions and downloads of the following publications:

- Tackle Climate Change: Use Wood
- Climate Change Factsheets (9)
- Building Sustainably with Wood. EcoHomes 2006 version
- Building Sustainably with Wood. Case Studies
- Wide Span Wood Sports Structures
- Large Span Timber Structures
- Innovation and Sustainability. Wood Products for Architects
- Builder's Guide to Timber in Construction
- Builder's Guide to Plywood
- Builder's Guide to Timber in Joinery
- Builder's Guide to Solid Wood Flooring
- Factsheets (Flooring, Cladding, Costructional Timber, Glulam & LVL, Windows & Conservatories, Doors, Mouldings, Climate Change, Decking, Engineered Wood Products, Lofts, Plywood, Timber frame, Finishes)
- David Domoney's Garden DIY Book
- Michael Jewitt's DIY Wood Cookbook

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## a sustainable building material.

There is increasing pressure on architects and builders from national and local government to reduce the impact of building and construction on the environment.

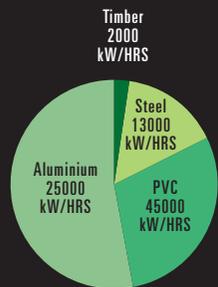
One answer is to use more wood, the most environmentally friendly commercial building material available.

Wood is naturally renewable, with a significant surplus of production over harvest in Northern Europe.

It helps limit the growth of global warming, as growing trees absorb CO<sub>2</sub> and produce the oxygen we breathe; it requires low energy inputs to harvest, transport and mill; and it can be recycled and then eventually burned for energy as a substitute for fossil fuels.

Well managed forests – managed with care for the environment and future generations – are typical of the UK, Nordic countries, Europe, Canada and the United States.

For additional reassurance, look for independent certification by, for example, the FSC (Forest Stewardship Council [www.fsc-uk.info](http://www.fsc-uk.info)) or PEFC (Pan-European Forestry Certification [www.pefc.co.uk](http://www.pefc.co.uk)).



Energy required to produce one tonne of building material

source: Centre for Alternative Technology

## why use wood?

- simplicity of use
- value for money
- high strength-to-weight ratio: strength for strength, Pine and Spruce are 16 times lighter than steel, 5 times lighter than concrete
- low thermal conductivity: 12 times better than concrete, 400 times better than steel, 1,500 times better than aluminium
- stable performance in fire: when timber burns it builds up a protective char layer which insulates the remaining section; this and its low co-efficient of expansion mean its mechanical properties are less affected by fire than other materials like steel, which can buckle and collapse
- good sound absorption
- non-toxicity
- recyclability
- sustainability. It comes from trees – nature's renewable resource.





Unsorted

Fifths

Sixths

## joinery timber.



**Spruce.** The dominant species in Nordic forests. Grows to a height of 40m.



**Pine.** There are about 90 species of Pine worldwide, but only one – *Pinus sylvestris* – is found wild in Scandinavia.

Joinery timber is used in finished product manufacture, as distinct from construction, with softwoods and hardwoods from the sustainably managed forests of Scandinavia and Europe being most commonly used in the UK.

Slow growth trees, typically from the Nordic countries, provide fine-grained dense wood, ideal for conversion to a wide range of quality furniture types and components.

The two main species are Pine (*Pinus sylvestris*), known as redwood, and Spruce (*Picea abies*), known as whitewood.

Both species share long cell fibres and a relatively high strength-to-weight ratio. Both are easy to work, glue and nail, although Spruce has harder knots. Pine's heartwood is a distinct reddish colour and naturally more durable than the sapwood. Spruce's heartwood is very similar to its sapwood, but Spruce's overall cell structure absorbs less moisture, making it suitable for outdoor use.

Timber is generally graded into three qualities, suitable for different end uses, as shown later in this publication:

- unsorted
- fifths
- sixths

Grading takes into account visual quality – i.e. splits, shakes, knots and staining – as well as form – i.e. wane, size, dimensional difference and deformation.

Timber appearance can vary from mill to mill, due both to the many different sources of raw material and the practice of producing 'tailor-made' grades for specific end uses.



## Furniture.

High quality wood is needed for furniture: unsorted and sawfalling grades of redwood as well as quality hardwoods.

Pre-manufactured components and composite sections, like glued wood laminates, are used to provide a near flawless finish. These grades are usually tailor-made to suit specific requirements, including finger-jointing and multiple lamination.





## species.

Below are the species most commonly used in joinery that are generally available from sustainable, well managed forests.

### Softwoods

Nordic Pine	Joinery, flooring, furniture
Nordic Spruce	Construction, panelling, cladding
Larch	Cladding, boats
Cedar	Joinery, garden products
Douglas Fir	Doors, joinery, construction
Hemlock	Doors, joinery, construction
Western Red Cedar	Cladding, shingles

### Common uses

### Hardwoods

European Ash	Interior joinery
European Beech	Interior joinery, furniture, flooring
European Birch	Furniture
European Cherry	Furniture, cabinet making
European Lime	Specialist wood turnings
Maple	Flooring, sports goods, tables
European Oak	Furniture, flooring, joinery
Sycamore	Interior joinery, flooring, turnings
European Walnut	Flooring, furniture, cabinets, clocks
Alder	Interior joinery, flooring

In Northern Scandinavia trees grow tall and straight, producing trunks with less internal stresses. Consistently shaped long logs provide good basic length specifications for conversion into quality joinery products.

### Durability

Different timber species vary in durability and in their response to treatment. For fully comprehensive advice on these and other technical issues visit [www.asktrada.co.uk](http://www.asktrada.co.uk)



Oak



Beech



Douglas Fir



Ash

## planed all round timber.



PAR/PSE (planed all round or planed square edge) timber is produced from the main joinery softwood species, but also from many sustainable hardwood species.

A comprehensive range of sizes and widths is available, ranging from approx. 12mm to 100mm in thickness and from 38mm to 275mm in width.

In softwood, unsorted, fifths and sawfalling qualities are used where the visual aspect is important. Sixths are used for hidden and constructional framework, such as seating.



## mouldings.

Mouldings are generally produced in a similar way to PAR/PSE timber, using similar species.

The best quality softwood ranges are usually manufactured from unsorted and sawfalling redwood and whitewood, but many product ranges are also made in fifths.

These products are manufactured in specialised high tech, high speed woodworking machines, producing an almost glass-like surface finish, which facilitates the application of stains, colours and finishes.

A wide range of sizes and profiles is available, covering most dimensions, from approx. 8mm to 50mm in thickness and from 28mm to 275mm in width.

Typical moulding products include skirting boards, architraves, window boards, beadings, dado rails and cornices.





## doors.



A very wide range of interior and exterior doors is available, from standard to solid softwood and hardwood feature doors.

They are produced using modern saw-milling techniques to provide high quality joinery timber. Increasingly, engineered laminated components are used for extra stability.

### Interior flush doors

The standard interior 'flush' door. Plywood, hardboard faced or moulded panel (creating different traditional panel door effects), with a softwood framework and cardboard core:

- framework made from specially kiln dried solid softwood
- finger-jointed timber may be used to ensure completely straight stile lengths
- quality grade plywoods are used to form smooth flush panels suitable for painting or staining
- pre-finished flush doors come in many surfaces/finishes
- laminated components offer production solutions



### Interior panel doors

Made from solid timber, typically Pine. Pine's versatility allows manufacturers to replicate Victorian panellled doors, but with the advantage of today's manufacturing techniques:

- Pine, kiln dried to 10-12% to ensure stability
- softwood specially graded and sanded for easier finishing
- timber specially selected at the mill to avoid defects
- engineered material, such as finger jointed timber, commonly used to produce completely straight components for stiles, and laminated or veneered timber



- top quality kiln dried Pine to eliminate panel shrinkage
- new heat treatment processes being introduced at sawmills to further enhance stability of timber sections.

### Exterior doors

Both flush and panellled exterior doors are also available in a wide range of patterns and sizes, with feature front doors available in softwood and hardwood, and panellled doors offering a choice of solid timber, plywood or glass panels.

Garage doors, using a solid timber frame with tongued and grooved Pine panels, 'French', or patio, doors, garden gates etc. are all widely available in many different styles.

10 year guarantees are offered by accredited BWF (British Woodworking Federation) manufacturers.



## fire doors and door sets

- fire doors are engineered safety devices and **MUST** be fitted and maintained correctly, preferably by trained installers
- fire doors must comply with BS 476 Part 22 and must be fitted using compatible products – (frames, seals, hinges, closers and other ironmongery)
- British Standards and Building Regulations determine the specification needed for fire doors and where they must be used
- use doors manufactured under the BWF–CERTIFIRE Fire Door and Doorset Scheme (see [www.bwf.org.uk](http://www.bwf.org.uk)) Under this scheme doors, glazed doors and frames are



## fire doors and door sets continued



Cutting an aperture and glazing on-site will invalidate the certification.

Fire doors should never be installed without intumescent fire seals.

For more information contact [www.trada.co.uk](http://www.trada.co.uk) or [www.bwf.org.uk](http://www.bwf.org.uk)



- supplied by certificated companies. Fire door sets, door leaves and door frames are supplied with a permanent, tamper evident, fully traceable label providing details of manufacturer, certification and fire door rating
- fire ratings for fire door assemblies (door, door frame and compatible components) and doorsets are in minutes and prefixed by the letters FD. E.g. FD 30 equates to a 30 minute (half hour) fire door or doorset. Common fire door ratings are FD30 and FD60
- door frames must be compatible with the door leaf in accordance with the door manufacturer's instructions and should be supplied by the door manufacturer or licensed, certificated frame manufacturer
- doors with glazed openings must be supplied by a BWF manufacturer certified to work on that specific door design and glazed according to the manufacturers' instructions
- fire door assemblies must be fitted with intumescent strip either in the two sides and the head of the frame or in the top and long edges of the door in accordance with the door manufacturer's instructions
- fire doors can be fitted with smoke seals, preventing smoke leakage through frame gaps/glazed openings/letter plates etc. These doors will have a suffix after their initial description e.g. FD30s and comply with BS 476 part 31:1
- ironmongery, hinges, closers, locks and latches **MUST** be CERTIFIRE approved, compatible with the door leaf and fitted in accordance with the door manufacturer's instructions
- fire doors and their components **MUST** be checked and maintained on a regular basis.

## staircases and components.



For further information concerning British Standards, see BS 585-1 and BS 5395-1-2-3.

For further technical information visit [www.bwf.org.uk](http://www.bwf.org.uk)



Manufacturers produce staircases to cover a wide range of applications, from 'straight' stock flights, to more complicated special order winding stairs. Designs are based on research with architects, builders and surveyors, as well as many years' experience.

Manufactured kits are available, complete with landings, balusters and spindles, providing a one-stop staircase solution that meets building regulations. (Part K of the building regulations applies. For more information visit [www.asktrada.co.uk](http://www.asktrada.co.uk) or [www.bwf.org.uk](http://www.bwf.org.uk)).

Staircases are manufactured in softwoods and hardwoods and often incorporate plywoods or other sheet materials. Component parts are often made from high quality white-wood because it provides wide sections (typically 250mm), while edge-laminated Pine offers an engineered solution.

The basic sections of a staircase consist of:

- the strings: the long side panel that fits along the wall
- the treads: the flat surface that is stepped on
- the risers: the vertical timber pieces joining each tread. Open tread staircases (with no risers) can be supplied.

The characteristics of a typical straight flight are:

- 13 steps
- floor to floor height of approx. 2574mm – 2639mm for a standard closed flight
- widths over the strings of 855mm – 914mm.

Made-to-measure staircases, or 'specials' are commonly available – for example, for loft conversions.



## windows.



The British Woodworking Federation's Timber Window Accreditation Scheme offers:

- 30 year guarantee against rot and fungal attack on all external timber components
- 10 year guarantee against double glazing failure for factory glazed windows
- 10 year guarantee against manufacturing defects
- 8 year minimum paint finish guarantee on factory finished windows.

It is far preferable to install factory fabricated windows, which will have been made with pressure treated timber under controlled conditions, than to build them yourself.

Manufactured windows are available in bespoke as well as standard metric or imperial sizes. They can come fully-finished, ready double-glazed, with full security features and ironmongery meeting secured-by-design and insurance requirements, and Part L compliant.

Pre-installed double glazing can feature clear, obscure, laminated, leaded or toughened safety glass, all compliant with BS 6262 1982 and NHBC recommendations.

Windows can be supplied direct from the factory with a range of finishes, from a base coat stain, offering short term protection before final finishes are applied on site, to a full finish in a variety of stains or paint colours, eliminating the need for on-site finishing altogether.

The wood industry has worked hard to address durability and performance, with suppliers and manufacturers co-operating to produce highly durable finished timber products backed by performance guarantees. This has resulted in a significant increase in market share.

For more information see [www.bwf.org.uk](http://www.bwf.org.uk)



In partnership with  
BSI Product Services



	<b>BWF ACCREDITED TIMBER WINDOW</b> BWF101 - E123456 Window Manufacturer Tel: 09876 543210	IMPORTANT DO NOT REMOVE OR DEFACE LABEL <b>E</b>	<b>Fully Factory                  Finished &amp;                  Factory Glazed</b>
	For more information see <a href="http://www.bwf.org.uk">www.bwf.org.uk</a>		

## conservatories.

A timber conservatory is both better looking and more environmentally-friendly than plastic or aluminium.

High quality manufactured windows, door and patio frames are commonly used in the assembly of conservatories, with planed joinery sections allowing windows to be fitted together to form sections of continuous glazing.

Components ready made for assembly into purpose built conservatories are also available.

Both (sustainable) hardwoods and softwoods are used.

When using softwood, ensure the timber is specially kiln dried and pressure treated with a suitable preservative.

Alternatively, heat treated wood (e.g. Thermowood®) is an increasingly popular option.

Modern production techniques, designed to eliminate natural timber defects, are resulting in engineered components which can be used together as a kit to produce joinery items.

Choosing the correct treatments and finishes will extend the life of the conservatory (see Finishes section).

For more information see [www.bwf.org.uk](http://www.bwf.org.uk)





## solid timber flooring.

Wood flooring is increasingly popular in the UK for domestic, commercial and public building. It is beautiful, durable, easy to install and maintain and adds value to any building. Solid timber flooring is available in a wide variety of factory-applied stains and finishes as well as in its natural state, ready to be finished on site.

Lengths are available from 1200mm to 5700mm, widths from 70mm to 250mm, thicknesses from 13mm to 30mm. Popular species include Nordic Pine, Nordic Spruce, Larch, European/American Oak, Beech and Maple.

When fitting a softwood floor use:

- timber specially kiln dried to 8-12% moisture content
- timber from slow-growth trees, like those from Scandinavia, for a high quality product
- boards taken from the heartwood at the centre of the log for maximum stability
- boards which are stress grooved on the underside and tongued and grooved on all four sides, for increased stability and a neater fit
- for best results allow the wood to stabilise to the room's conditions for 24hrs (48hrs for hardwood) before fixing
- use an 8mm spacer block against all walls to ensure you leave space for expansion.

The amount of expected traffic and tracking-in of grit etc. needs to be considered when specifying finishes.



Compressed engineered flooring

### Wood veneers

- veneers 2.5 to 3.5mm thick, combined with three ply substrata, provide lower cost, stable surfaces
- planks come in many formats, tongued and grooved
- hardened finishes are available using lacquers, oils and waxes.

### Constructional solutions

- major manufacturers supply ready-made flooring systems as pre-fabricated solutions which speed up building finishing times, meet sound, fire and load-bearing demands and come backed by technical and computer expertise.

### Compressed wood

- new, patented processes suitable for heavy traffic areas can increase the hardness of wood species (Pine can be as hard as Oak).

For more information ask for your free copy of the wood. for good. builder's guide to wood flooring by e-mailing [info@woodforgood.com](mailto:info@woodforgood.com) or calling 0800 279 0016.



Engineered flooring with hardwearing solid wood surface.



## panelling.



Timber panelling can be used to create many different effects, from rustic, to classic, to contemporary; on walls and on ceilings.

As well as adding character to a room, timber cladding can be used to improve thermal and acoustic insulation and to mask defects.

Many species are suitable, but Pine and Spruce are the most popular and are also available in a variety of pre-finished stains and finishes.

Boards come tongued and grooved in a range of sizes and decorative profiles with thicknesses from approx. 7mm to 25mm – boards thicker than 12mm providing additional structural strength.

For best results use timber manufactured from higher grades and kiln dried to 8-12%. Store in the room for 24hrs before fitting.

On stud walls and unplastered ceilings, the panelling can be nailed direct to the studs or joists.

Otherwise, 22 x 38mm sawn battens provide an easy surface on which to nail the panelling and also form a flat base (fig 1). Pack out any substantial irregularities under the battens.

Use 'secret nailing': drive the nails diagonally through the tongue of each board (fig 2). Only the first and last boards require nailing through the face. Punch these home and fill with wood filler.

Don't forget to allow an expansion gap around the perimeter of the panelling, particularly across the width of the boards. Use skirting boards and moulded trims to hide these gaps (fig 3).

Sound insulation should also be considered between walls and floors in order to prevent noise transmission between floors or to an adjoining neighbour's house.

Pre-finished panelling systems are becoming increasingly available. Designed for accurate and rapid installation, they also avoid the need for on-site finishing.

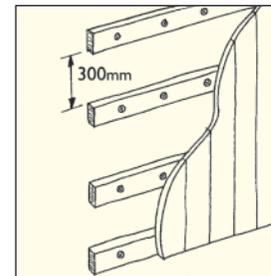


Figure 1

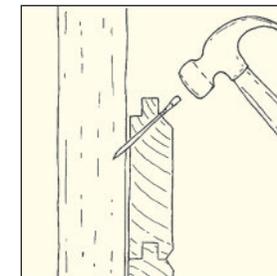


Figure 2

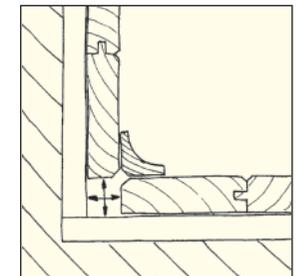


Figure 3





## cladding.



For more information on the durability of specific species, consult BS EN 350.

For more information on species durability consult BS EN 350.

For more information on external timber cladding, contact TRADA at [www.asktrada.co.uk](http://www.asktrada.co.uk).



Timber is increasingly used for the exterior cladding of buildings of many different construction types. Both softwoods and hardwoods are suitable. Softwoods should generally be pressure treated with preservative, although Larch and Western Red Cedar can be used untreated if the sapwood is excluded.

Suitable softwoods include Nordic Redwood (Pine), Nordic Whitewood (Spruce) Larch and Western Red Cedar. Ensure only the higher grades of unsorted, sawfalling and fifth qualities of Pine and Spruce are used.

Temperate hardwoods, like European Oak, are increasingly used instead of tropical hardwoods because of concerns over sourcing sustainable timber.

Tips:

- ensure any cut ends are treated with preservative
- fix onto pre-treated battens
- battens should be at least 38mm wide, at least 19mm thick and fixed at 600mm centres
- ensure joints meet centrally on a batten
- allow for draining and ventilation in the cladding
- use timber at least 150mm wide
- use tongued and grooved or rebated cladding for vertical installation – with the tongue uppermost
- use shiplap style cladding for horizontal installation
- always base-coat the back of the cladding before fixing
- ultra violet light can cause timber to take on a grey colour. This can create problems, especially in softwoods – always apply a suitable surface treatment.

## plywood.

Plywood is a highly versatile material.

Light, strong and stable, it is available in a range of thicknesses and finishes, suitable for a wide range of applications from wall and floor sheathing to designer interiors.

The two main species are Birch and Spruce. While each is available in a range of grades suitable for a variety of uses, Birch tends to be used where visual appearance or surface strength are paramount, in floor or wall systems, furniture or load bearing structures. Spruce, which has more knots and is lighter and less dense, is generally used for wall, floor and roof sheathing in house construction.

Thicknesses range from 4mm up to 50mm.

For more information on plywood, including the Builder's Guide to Plywood and other publications, visit [www.woodforgood.com](http://www.woodforgood.com)



### CE MARKING: STRUCTURAL PLYWOOD.

Any plywood being sold and used in the UK for structural applications should be marked to show that it complies to EN636 and EN13986 - the standards for plywood - and should have structural credentials to Eurocode 5 or BS 5268-2:2002.

Much of the plywood sold in the UK for structural use is also often marked with a CE mark to show that it complies to these standards. Although the mark itself is not a legal requirement in the UK, the easiest way for a manufacturer to demonstrate compliance with the CPD is to apply the CE mark to their panels.

CE marked plywood is extra proof that the product is suitable. Specifiers and users are strongly advised to obtain evidence from their supplier that the plywood can be used in structural applications. A concise description of the CE marking process can be found in the TRADA document: 'CE marking: Implications for timber products.'



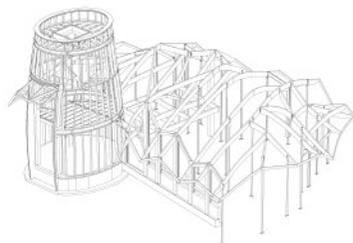
## laminated veneer lumber.



Laminated veneer lumber, or LVL, is typical of the engineered timber solutions made possible by modern manufacturing techniques.

It is designed for use in load-bearing situations where the structure requires strength:

- manufactured from rotary peeled veneers glued into continuous panels
- excellent load-bearing capacity
- high strength-to-weight ratio, making site work easier and more cost-effective
- dimensional precision, giving architects and builders greater design opportunities
- warps, splits and twists etc. are greatly reduced
- available as studs, for load-bearing structures, with grain running longitudinally throughout the veneers
- available as beams, with the grain running longitudinally through the veneer layers
- available as panels, with cross glued veneers creating great strength and vertical load-bearing characteristics
- 1.8m panels can be cut to make specific beam sizes or planks
- available thicknesses range from 27mm to 75mm
- available in lengths up to a maximum of 26m.



Kerto is a registered trademark of Finnforest. For more information visit [www.finnforest.co.uk](http://www.finnforest.co.uk)

Prolam is a registered trademark of UPM. For more information visit [www.wisa.com](http://www.wisa.com)

## laminated wood panels.



Laminated wood panels are engineered to meet the specifications of modern furniture production. By combining wood panels with solid timber planed sections and plywood veneers, manufacturers can produce contemporary wood furniture at an economic cost.

A wide range of qualities and grades is available, from higher qualities for exposed faces, to cheaper grades where appearance is less important.



Quality planed surfaces are ideal for pre-finishing with lacquers, paints or stains.

Panels are made from timber that has been kiln dried down to an 8-10% moisture content for excellent stability.

Construction allows for further machining and gluing.

Sizes:

- lamells from 40mm to 45mm wide
- thicknesses from 6mm to 70mm
- widths from 200mm to 1250mm
- lengths from 300mm to 5000mm.





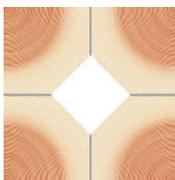
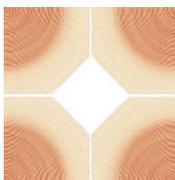
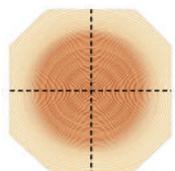
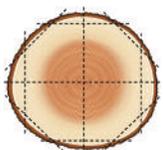
Quatrolit™ 140x140  
(Planed to 140x140)



Monolit® 100x100  
(Planed to 93x93)



## specialised manufactured products.



Quatrolit™

The sawmills have invested considerable effort in research and development to produce timber products that will help joinery manufacturers to produce final timber products of the highest possible quality.

Timber is now being engineered into much larger sections than is possible with conventional sawn sections, providing superior strength and stability and, when coupled with special heat treatment, virtually no shakes or splits.

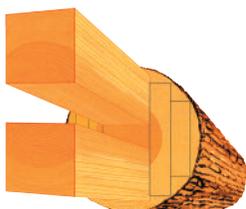
One process turns logs inside out so that the fresh knots, close to the pith, are turned outwards. The growth ring orientation ensures invisible joints, making it an excellent material for turnings and assemblies, thanks to its hollow central cavity.

Traditionally, timber for joinery was produced in large sections that then had to be re-cut into more usable sizes. This produced problems, as recut surfaces released tensions, causing splits and shakes and costly wastage.

Sawmills are changing techniques and producing sizes compatible with the final products. These products fall into two main categories: 'centre free' and 'green split'.

### Centre free

The centre of the timber is removed in order to help eliminate the splits and shakes which are occasioned by the heartwood. By removing the pith, the amount of splay knots, common with centre log sections, is reduced – of benefit in the production of quality turned products.



Monolit®

### Green split

This is a production method where the mill produces component size sections which are dried to give a consistent moisture content throughout. This 'fit for purpose' method means that the timber can be graded on surfaces that have been exposed in the production process. Kilning can then be calculated to take into account the final product use.

### Heartwood

X-ray scanning allows sawmills to select Pine logs with the maximum amount of heartwood in commercially viable volumes, providing joinery manufacturers with raw materials optimised for increased stability, natural durability, quality and economy.

Processing of these types of heartwood products takes into account density, yearly rings and knots, to further enhance grading, improving overall stability and performance.

Other benefits include:

- on-line factory moisture checks
- defect elimination
- optional splitting to required dimensions
- consistent surfaces
- finger-jointing with continuous grain
- heartwood for externally exposed surfaces of windows and doors
- thicknesses from 50mm to 150mm
- lengths from 2000mm to 6000mm
- knot-free components can be produced by finger-jointing.

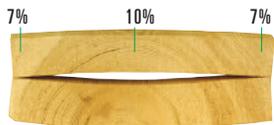


Moisture content  
10% throughout



Relax™ timber

Moisture content



Conventional timber

## Relax™

The way timber is dried is important in determining the stability of the final product. This is particularly relevant for joinery timber. In a patented process called Relax™, developed by Swedish softwood producers such as SCA and Iggesund Timber, moisture content is evened out to reduce the internal tensions that can cause distortions.

In conventionally dried timber, the moisture content in the middle may be higher than at the surfaces. In time, the moisture content evens out.

As timber shrinks when it dries, differences in moisture content can result in defects such as splits and shakes.

In Relax™ timber, large quantities of steam (up to 65°C) are used initially to heat up the timber, minimising shakes. Steam is then used at the end of the process to even out the moisture (8/10/12/14% moisture content available).

The result is tension-free timber, with greater stability, fewer defects and greater resistance to cupping, suitable for finished products like joinery items and mouldings.

## Finger-jointing

Finger-jointing, using parallel cut fingers bonded together with glue under high pressure, is increasingly used to produce the long, straight, knot-free, strong timber the joinery industry needs in order to create high quality finished products.

Lengths up to 12m can be produced with minimal wastage.



- moisture content reduced by up to 50%
- wood becomes darker
- bending strength reduced by 10 - 20%
- splitting strength reduced by up to 50%
- deformation reduced by up to 50%
- resin removed
- improved weather resistance
- improved rot resistance

## Heat treated wood.

Heat treated wood, e.g. ThermoWood®, is softwood that has been treated at temperatures up to 215°C to change the cell structure of the wood, reducing equilibrium moisture content by up to 50%, expelling resin and breaking down some of the natural sugars.

The timber is PEFC (Programme for the Endorsement of Forest Certification) certified, the process is chemical-free using heat and steam and the softwood timber becomes more durable and stable.

Suitable for cladding, decking, windows, doors, garden furniture, fencing, noise barriers and many other products vulnerable to harsh conditions.

Please note:

- use stainless or galvanised fittings
- apply annular ring shanked nails level to the boards' surface
- can be fixed as normal timber, pre-drilling for screws
- UV light will grey ThermoWood®, as any timber. Finishes, including oil and water based stains may be applied.

Contact Finnforest at [www.finnforest.co.uk](http://www.finnforest.co.uk) or Stora Enso at [www.storaenso.com](http://www.storaenso.com)





## glulam.



Beams or columns made from layers of parallel Pine or Spruce lamellas, cut following the grain and glued together.

With a better strength-to-weight ratio than steel, attractive looks, good fire performance and excellent environmental credentials, glulam is increasingly used for long span load-bearing structures like school halls and bridges.

A wide variety of sizes can be produced, with lengths up to 31000mm (see table), with tailor made sizes available for specific needs.



### Glulam cross-sections

Standard widths:	from 90mm up to 240mm
Special widths:	365mm and 290mm
Standard heights:	up to 2050mm
Maximum length:	31000mm
Planed posts:	90-200mm wide x 90-420mm high

## finishes.

Sadolin Woodshield Opaque Wood Protection for windows, doors and conservatories.

### Exterior

Factory applied coatings – which often carry an extensive paint life guarantee:

- deliver good product application with UV light protection
- avoid problems associated with poor weather and site debris
- allow finishing at a stable moisture content.



A range of finishing products for exterior use is available, from Sikkens and Sadolin. For exterior joinery where a translucent finish is required, use Cetol HLS plus and Cetol Filter 7. For opaque, paint like finish, use Rubbol Satura or Rubbol AZ, satin and gloss finishes.

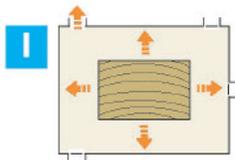
### Interior

- for floors, Sadolin PV67 is extremely tough and hard wearing
- Sikkens Cetol BL Decor provides decoration for interior softwoods and hardwoods and can be overcoated with Cetol BL Unitop, a colourless varnish, for added protection.

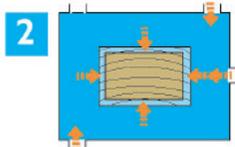


### General

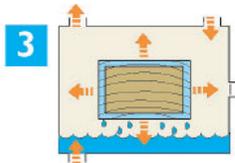
- ensure exposed end grain sections are thoroughly coated
- a dry film build of 100-150 micrometres is recommended
- translucent coatings may be used for a more natural look
- very light shades, such as browns or yellows are not as durable as mid-range brown shades
- paint coatings provide the longest maintenance-free periods as they provide the most effective UV screen
- regular cleaning will help extend maintenance intervals.



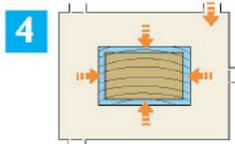
**1** Vacuum created and timber cells evacuated of air. Vacuum held.



**2** Vessel flooded under vacuum, release of which then forces preservative under atmospheric pressure into the wood cells. With a double vacuum process low pressure may then be applied. With a vacuum pressure process hydraulic pressure is applied to force the preservative further into the wood structure.



**3** Second vacuum applied to evacuate cells of preservative. Surface wet.



**4** Venting to atmospheric pressure drives surface preservative back into the timber. Surface drip dry.

**treatment.**

**Why preservative treat wood?**

No timber is totally immune to deterioration if exposed, over a sufficient period of time, to one or more of the agents that can cause timber to degrade.

Wood protection involves the removal or control of one or more of these agents by introducing various approved chemicals into the timber. Other methods of wood enhancement by molecular alteration and heat treatment also help preserve timber.

*In order to gain approval, preservatives must be tested in accordance with BS EN 599-1 to determine levels of effectiveness for particular areas of use. In the UK, these tests are laboratory-based.*

**Industrial treatments**

Industrial pre-treatment is the most effective method of protecting timber. The main two processes are carried out in enclosed systems.

**Double Vacuum or Low Pressure Treatment:** used for timbers destined for Use Class I-3A. Treatment provides an effective 'envelope' protection around the timber. Some companies use a colour tint that identifies the timber as being treated.

**Vacuum Pressure or High Pressure Treatments:** suitable for a full range of end uses, particularly external applications, both in and out of ground contact. Preservative enters the cellular structure and gives the timber a green colouration. For landscaping applications, a brown colouration and water repellent can be added.



Whichever process is used, the UK utilises new generation preservatives based on the latest biocidal technologies, providing an appropriate timber protection. For the double vacuum/low pressure treatment, there is a choice of water solvent based systems.

Vacuum pressure/high pressure treatments are all water-based and utilise copper as the main ingredient combined with organic secondary biocides.

Use classes help us to identify where natural durability is not enough. In such cases, preservative treatment is a must to protect wood from bio-degradation.

**Preservative treatments**

There are 3 basic types of preservative treatments: waterborne, organic solvent and tar oils.

**Waterborne:** Waterborne wood preservatives use water as the carrier to take the active ingredients into the timber.

**Organic:** Organic solvent-based preservatives use white spirit or petroleum distillate as a carrier for the active ingredients, in the same way that water-soluble types use water as the carrier.

**Tar:** Tar oils are blends of distillate oils, mainly from coal tar with a boiling range from 200°C to 400°C.

The only tar oil used for preservation is Creosote. Creosote has been used successfully for many years. Creosote is an oil-type preservative which is insoluble in water, resistant to leaching and does not cause wood to swell during treatment.

Hazard Class Table	
Class	Hazard
1	Internal. No risk of wetting or condensation
2	Internal. Risk of wetting and condensation
3a	External. Above damp proof course - coated
3b	External. Above damp proof course - uncoated
4	External. Soil or fresh water contact



Waterborne preservatives are soluble in water during treatment. They can be either fixed or unfixed. Fixed preservatives react chemically to form insoluble compounds that bond to the wood. Subsequent rewetting of the wood will not cause preservative loss. Unfixed compounds do not bond with the wood and should not be used in areas where timber will be permanently wet.

The most commonly used waterborne preservatives are based on copper plus organic biocides. These are classified as fixed and are used to protect timber in service from all major biodeteriogens including decay fungi, wood boring insects and termites. These products have a wide range of applications ranging from decks and patios to wood-frame houses.

Borates are another type of waterborne preservative and generally provide effective protection against attack by wood boring insects. They are applied either by a diffusion process or by a vacuum pressure process that delivers boron relatively deeply into the timber. The boron is not fixed in the timber, regardless of whether it is applied by diffusion or vacuum pressure impregnation. It can therefore leach out, and this restricts boron-treated timber to interior uses such as flooring and framing, where it is protected from the weather.

It protects timber against decay and insect and borer attack and is a brownish-black oil composed of hundreds of organic compounds made for preservative use by distilling coal tar. Creosote treatment gives wood a dark brown to black colour and is used extensively in treating poles, sleepers and bridge timbers.

Use class	Use	Principal Biological Agency	Typical Service Situation	Examples
1	Above ground, covered. Permanently dry. Permanently <18% moisture content.	Insects	Internal with no risk of wetting or condensation.	All timbers in normal pitched roofs except tiling battens and valley gutter members. Floor boards, architraves, internal joinery, skirtings. All timbers in upper floors not built into solid external walls.
2	Above ground, covered. Occasional risk of wetting. Occasionally >20% moisture content.	Fungi insects	Internal with risk of wetting or condensation.	Tiling battens, frame timbers in timber frame houses*, timber in pitched roofs with high condensation risk, timbers in flat roofs, ground floor joists*, sole plates (above dpc), timber joists in upper floors built into external walls.
3	Above ground, not covered. Exposed to frequent wetting. Often >20% moisture content.	Fungi	A – External, above damp proof course (dpc) – coated. B – External, above damp proof course (dpc) – uncoated.	External joinery including roof soffits and fascias, bargeboards etc. cladding, valley guttering timbers. Fence rails, gates, fence boards, deck boards and balustrades, agricultural timbers not in soil/manure contact.
4	In contact with ground or fresh water. Permanently exposed to wetting. Permanently >20% moisture content.  Permanently >20% moisture content.	Fungi	A – Soil contact. Timbers in permanent contact with the ground or below dpc. B – Fresh water contact. Timbers in permanent contact with fresh water. C – Cooling tower packing. Timber exposed to the particularly hazardous environment of cooling towers.	Fence posts, gravel boards, deck supports, agricultural timbers in soil/manure contact, poles, sleepers, playground equipment, motorway and highway fencing, sole plates below dpc.  Lock gates, revetments.  Cooling tower packing (fresh water).
5	Permanently exposed to sea wetting by salt water.  Permanently >20% moisture content.	Marine borers  Fungi	All components in permanent contact with sea water.	Marine piling, piers and jetties, dock gates, sea defences, ships' hulls, cooling tower packing (sea water).

\* These timbers are assigned to a higher use class than suggested by their location in the structure, owing to the potential consequences of failure based on experience within the UK.



## information on standards.

For comprehensive information on British and European standards, contact [www.trada.co.uk](http://www.trada.co.uk)

### Classification

BS EN 942 covers the general classification of timber quality, including information on knots, shakes, discolouration and many other factors relating to timber used in joinery.

### Treatment

BS 1282 1999 – wood preservative

BS 5589 1989 – code of practice for timber preservatives

BS BEN 350-2 1994 – durability

BS EN 942 1996 – quality classification

BS 8417 – recommendations for timber preservation

### Adhesives

BS EN 204:2001 – classification of thermoplastic adhesives for non-structural use

BS EN 301 1992 – adhesives for load-bearing timber structures

BS EN 923 1998 – adhesives, terms and conditions

### CE marking and Europe

The European Union is aiming to break down technical barriers to trade in construction products throughout member states, through the CPD (Construction Products Directive).

This covers timber and associated products that are to be permanently incorporated in building works.

The essential requirements for products are:

- mechanical resistance and stability
- safety in case of fire
- hygiene, health and environment
- safety in use
- protection against noise
- energy, economy and heat retention.

Products would have a certificate of conformity and can be CE marked – in effect a statement by the manufacturer that the goods conform to the essential CPD requirements.

Many timber products are already covered by this, e.g.

- I-beams
- stair kits
- wood based panels for construction.

More timber and timber-based products are scheduled to be included; for example, windows have an estimated date for compliance of 2006.

Compliance is important and will be supported by trading standards and building control officers. Non-compliance will incur financial penalties for companies and individuals.

For further information contact [www.trada.co.uk](http://www.trada.co.uk)



for further information.



**The British Woodworking Federation**  
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Tel: 020 7608 5050  
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The voice of the UK woodworking and joinery industry.



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www.trada.co.uk  
Specialists in timber technology, information and research.



**The Wood Protection Association**  
1 Gleneagles House, Vernongate, Derby DE1 1UP.  
Tel: 01332 225100  
www.wood-protection.org info@wood-protection.org



Timber Trade Federation

**The Timber Trade Federation**  
Clareville House, 26/27 Oxenden Street, London SW1Y 4EL.  
Tel: 020 7839 1891  
www.ttf.co.uk



For a list of quality timber suppliers throughout the UK, to search for timber product supply and for a copy of the TTF Conduct Assurance Scheme.

**The Timber Decking Association**  
Circe Building, Wheldon Road, Castleford, West Yorkshire WF10 2JT.  
Tel: 01977 712718  
www.tda.org  
For advice concerning well designed high performance timber decking, materials and best practice. See the TDA Deckmark Quality Assurance scheme.



Arch Timber Protection

**Arch Timber Protection**  
Wheldon Road, Castleford, West Yorkshire WF10 2JT.  
Tel: 01977 714000  
www.archtp.com



**Osmose Treatment Solutions**  
Osmose, Fieldhouse Lane, Marlow, Buckinghamshire SL7 1LS.  
www.osmose.co.uk



**Sikken's**  
Akzo Nobel Specialist Coatings, Meadow Lane, St Ives,  
Cambridgeshire PE27 4UY.  
Tel: +44 (0)1480 484235  
Fax: +44 (0)1480 496801  
www.sikken's.co.uk



Some leading forest products producers' UK offices:

**Setra Sales UK Ltd**  
The Barn, Court Farm, Tithepit Shaw Lane, Warlingham, Surrey CR6 9AT.  
Tel: 01883 627 527  
www.setragroup.se



**Finnforest UK Ltd**  
The Heights, 59-65 Lowlands Road, Harrow-on-the-Hill, Middlesex HA1 3AE.  
Tel: 020 8420 0777  
www.finnforest.co.uk



**SCA Timber UK Ltd**  
Grove Wharf Cottage, Neap House Road, Gunness, Scunthorpe, Lincolnshire DN15 8TY.  
Tel: 01724 784784  
www.forestproducts.sca.com



**Stora Enso Timber UK Ltd**  
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