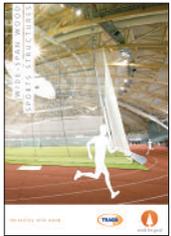




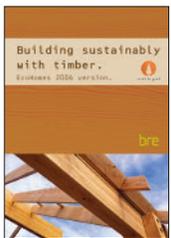
the builder's guide
to plywood.



wood. for good.

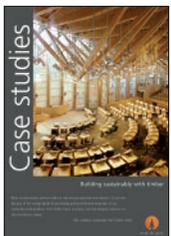
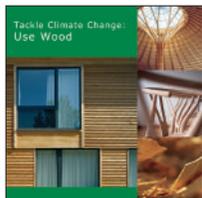


wood for good is a generic wood campaign sponsored by The Swedish Timber Industry, the Forestry Commission, ConFor (The Confederation of Forest Industries) and the Northern Ireland Forest Service. All members are committed to sustainable forest management. In each of the members' countries credible third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



Visit www.woodforgood.com 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, Costructural 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.

Using plywood is a good way to help reduce the growth of global warming because wood is a renewable building material; as trees grow, they absorb carbon dioxide from the atmosphere, giving out the oxygen we breathe.

The carbon is then stored for the life of the tree and the life of the product. It can even be recycled.

And in Northern Europe, our forests are managed so that there are more trees growing than being harvested. In fact the annual surplus of growth over harvest is a staggering 252 million cubic metres – roughly 30 times the UK's total annual consumption of wood!*

Nordic plywood, sourced from sustainable, well-managed Nordic forests, is one of the most environmentally-friendly building materials available and many individual Nordic plywood products carry the PEFC (Pan-European Forestry Certification) logo, granted by the Finnish Forest Certification Council.

*Source: UN-ECE FAO TBFRA 2000

a basic guide to plywood.

Plywood is a highly versatile building material which spans a wide range of applications from wall and floor sheathing to designer interiors and glider fuselages.

There are many types of plywood available, including specialist tropical veneers such as marine plywood which, while having very good weather resistance and strength properties, comply to specific standards such as BS 1088 (plywood in marine use), rather than the structural standard code BS 5268-2:2002.

As this literature is designed for builders, it deals mainly with structural plywood, which can be sourced from Finland, Sweden, America or Canada.

Produced mainly in Finland, Nordic plywood is the predominant supply of quality plywood in the UK, offering a comprehensive range of sizes and types, whether decorative or structural, all complying to the highest standards, all sourced from sustainable forests.

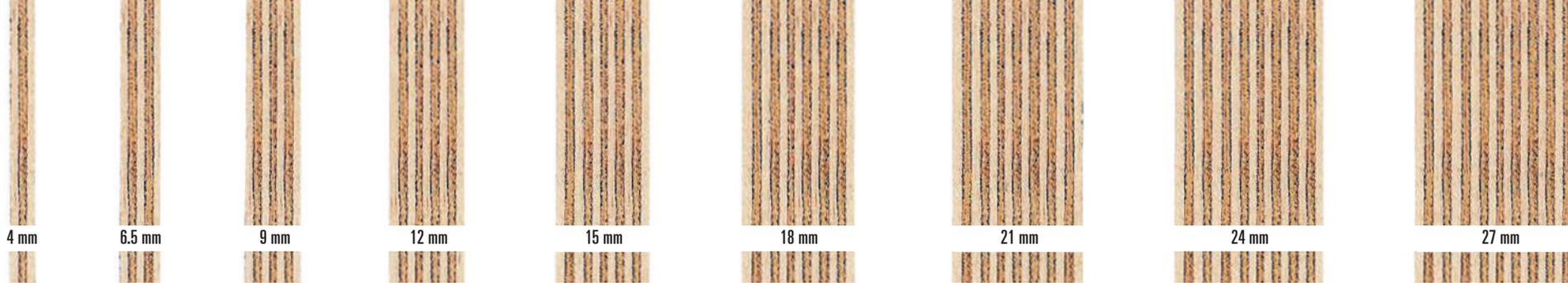
With over 100 years' production experience, Nordic plywood provides exceptional uniformity as well as quality, making it easy to use in building and construction projects, while constant research and development by the producing mills ensures all specifications meet today's stringent building requirements.

WARNING

If you use plywood structurally that isn't listed in code BS 5268-2:2002, you risk liability, should failure occur. Don't take the risk – all Nordic structural plywood is listed in the code.



wood. for good.



Thicknesses and layers
(up to 50mm available).

There are two main types of plywood:

Birch

Properties

- Noted for its strength, stiffness and resistance to creep
- High impact resistance, especially suitable for heavy-duty floor and wall structures
- Hard surface, less likely to suffer damage
- Attractive visual appearance, sanded and an excellent base for further finishing

Typical uses

- Floor and wall systems
- Furniture
- Formwork
- Die-boards
- Load-bearing structures

Spruce

Properties

- Less dense surface than birch
- Prominent grain structure, more surface knots
- Panels are lightweight, easy to work and nail
- Reasonably good strength and stiffness properties

Typical uses

- Floors, walls and roofs in house construction
- Internal vehicle panel work
- Packaging and boxes
- Temporary fencing works



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.'

Manufacture

The raw material used for manufacturing plywood consists of either uniform quality birch, or closely grained coniferous wood.

Logs are peeled into veneers which are then glued together, layer by layer, cross-banded, to use the natural strength of the wood's grain to create strong and rigid wooden panels.

The production of good, solid plywood products able to withstand extreme weather conditions is assured by using phenolic formaldehyde resin in the gluing process.

Use plywood bonded with urea formaldehyde glue in dry conditions only.

Keep panels flat when storing, stacked on a firm base, with enough bearers to prevent sagging. Store in similar conditions of temperature and humidity to where they will be used.





Grade B



Grade II



Grade III



Grade S



Grade BB



Grade WG

Plywood grades

Birch and spruce plywoods are available in different grades, suitable for different applications.

Spruce

Grade II/III: Faces contain large knots and various allowable repairs. Suitable for wall and roof sheathing. Also for lining, where face quality isn't important. Grade II side has fewer large defects than Grade III side.

Grade III/III: Both sides as the Grade III side (above). Good for floors, wall sheathing, roofing and general building work.

Birch

Grade B: Clean face, few blemishes, suitable for clear finishing.

Grade S: Similar to B, but allows more natural features such as small knots and darker coloured streaks.

Grade BB: The standard commercial grade available at most trade outlets. Boards are sound, but faces can contain plugs and patches. Use for general construction work, where face finish is not critical.

Grade WG: Well made board, but with many face defects. Use for carcassing and packing cases, where strength, rather than appearance, is important.



plywood wall sheathing.

Strong, light, accurate, with excellent stability, plywood is perfect for many structural uses where strength and ease of handling are required.

BS 5268-2:2002 listed, both spruce and birch are ideal for use in wall construction, whether load-bearing or partition, although the better grades of birch are generally used for decorative walls, where its superior finish is as important as its strength.

Use plywood for constructing hidden structures in exterior walls, as well as for providing wind protection.

Use plywood for both interior and exterior panelling work to provide increased rigidity and load-bearing capacity for the wall's structure.

The frame and plywood panels form a wall structure with precise dimensions and rigid structure, which is quick and easy to line and insulate.

Increase fire resistance by using suitable fire resistant insulation materials, like Aquafire.

Standard panel sizes

1220mm x 2440mm
1220mm x 3050mm
1220mm x 3660mm

Standard panel thicknesses

4mm, 6.5mm, 9mm, 12mm,
15mm, 18mm, 21mm, 24mm,
27mm, 30mm

Recommended thickness for wall and ceiling panelling is 12mm.

WARNING

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interior plywood walls.

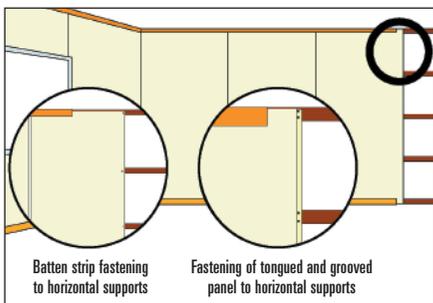


Plywood is an attractive and natural material, increasingly used for interior decoration. Apart from its aesthetic qualities, it is highly durable and its surface is pleasantly warm. It has good acoustic properties and, thanks to its ability to balance fluctuations in temperature and humidity, it helps provide a healthy indoor environment.

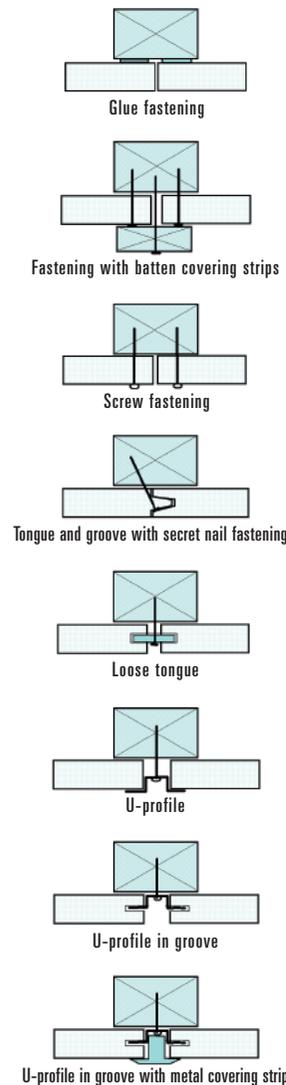
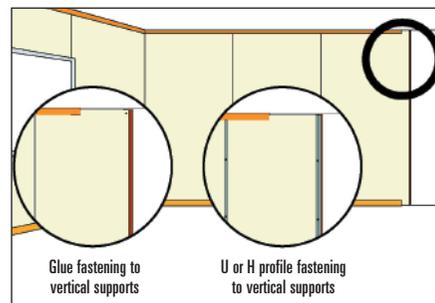
Use a good grade of birch plywood if the surface is to be visible. The finished face can be varnished, stained or painted for a variety of visual effects. Edges can be left exposed to striking visual effect. Remember to varnish or otherwise seal the bottom edge of any panel likely to come into contact with the floor before it is fitted, to avoid any seepage up the panel from floor cleaning.

Creating plywood interiors is simple, the machining and installation of panels is easy and flat. But you have to follow certain simple rules.

Wall Panelling, Horizontal Supports



Wall Panelling, Vertical Supports



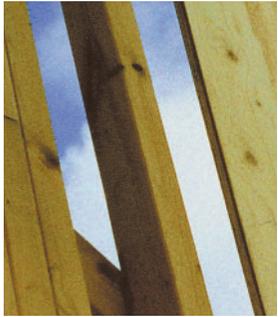
Fixing methods

- Joints: decide whether you want to conceal joints, or use them as a feature (see diagrams)
- Panel gaps: leave sufficient expansion gap between panels to allow for dimensional changes due to changing moisture levels
- Supports: space supports between 400mm and 600mm c/c
- Fastenings: use wood screws, nails, adhesives or machined profiles. Remember to use screw lengths of 2.5 to 3 times the panel thickness
- Fixing: leave a fixing distance from the edge of the panel of at least the panel's thickness. Nails/screws to be 150mm c/c along the edges; 300mm elsewhere





roofing.



Spruce plywood is ideal for use as a roofing membrane, strong, lightweight, easy to handle and fully compliant with BS 5268-2:2002.

Precisely dimensioned, the panels are easily converted into durable surfaces, such as the foundation for the construction of moisture barrier roof structures.

They can also be fitted together to form safe working surfaces while the roof installation is being carried out.

In attic spaces, the foundation panels can be left uncovered.

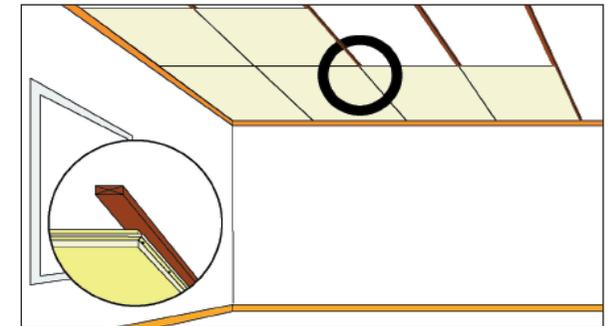
WARNING

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Installation

- When using on-site, store panels in dry conditions, on a flat, level surface, clear of the ground
- Joists must be treated 'dry', or proprietary I-beam
- Regularise timbers to provide an even bearing surface for the panels
- Ensure all roof support timber dimensions and spacings are calculated by a qualified structural engineer in accordance with the overall requirements of the roof
- Lay panels with the face grain parallel to the span
- Support all short edges on a joist and stagger end joints
- Support the perimeter of the roof continuously on noggins
- Use galvanised flat head nails, or countersunk screws, 2.5 times the panel's thickness
- Space fixings not less than 4 to each supporting timber per board width of 1220mm and not less than 10mm from the panel edge
- Protect panels from wet weather until felt battens and tiles have been fixed. Some manufacturers provide a removable weather-resistant coating to give short term protection

Panelling of Ceilings





structural floors.

Spruce plywood is a durable flooring panel, ideal as a substrate for most surface materials, whether in new building or renovation work, and listed in BS 5268-2:2002.

It is also suitable for ready floors in warehouses etc.

Strong and rigid, with good load-bearing properties, the panels allow longer span measures, making savings in construction material possible.

As they are made from solid wood, the panels have good sound insulation properties and can be used to construct sound-insulated structures.

Standard panel sizes
1220 x 2440mm

Standard panel thicknesses
12mm, 15mm, 18mm, 22mm

Installation

When using on-site, store panels in dry conditions, on a flat, level surface, clear of the ground. Loose lay the panels 24 to 48 hours before fixing so as to acclimatise them.

Joisted floors

- Joists must be treated 'dry', or proprietary I-beam
- Regularise joists to provide an even bearing surface
- Lay panels with the face grain parallel to the span
- Support all short edges on a joist and stagger end joints
- Support the perimeter of the floor continuously on noggins
- Allow a perimeter expansion gap of 2mm per meter width/length of the floor, with a minimum gap of 10mm



- Robust
- Stable
- Safe working platform
- Durable
- Lightweight
- Surface protection



- Use a waterproof PVA adhesive to glue joints and panels to joists
- Use galvanised annular ring shank nails 2.5 times the panel's thickness, or countersunk screws recessed 2mm below the panel surface, to fix panels to joists
- Space fixings not less than 10mm from the panel edge, at 150mm intervals round the edge and at 300mm intervals elsewhere
- When fixing decorative boards, 'secret nail' through the tongue to keep the surface free of fixings. Use a suitable mastic type adhesive applied to the underside of the panels and the joists to provide extra fixing



Continuously supported floors

- Ensure floors are clean, dry and flat – concrete and beam and block floors should be free from nibs and projections; screeded floors should be fully dried out before floor laying
- On concrete and beam and block floors, lay a 1000 gauge polythene sheet as a vapour barrier. Lap and seal any joints in the sheet with vapour resistant tape
- Depending on the level of thermal insulation required, an insulating underlay, such as closed cell extruded polystyrene, can be placed on the sub-floor
- On existing timber floors, providing they are clean and level, the panels may be laid directly, or a thin (5mm) quilting can be used to offset any unevenness
- Lay the panels with the short ends staggered
- Spot bond the undersides of the panels to the sub-floor with a mastic type adhesive
- Allow a perimeter expansion gap of 2mm per meter width/length of the floor, with a minimum gap of 10mm
- Access traps should be pre-planned; provide support on all sides of the trap

plywood decorative floors.

Finnish Birchfloor is a plywood panel designed specifically for use as a domestic or office decorative floor. BS 5268-2:2002 listed, it has structural strength as well as decorative looks and is supplied tongued and grooved on all sides.

It is manufactured from high quality 1.4mm thick Finnish birch veneers. The face veneers are long grained, and the faces fully sanded, suitable for staining. Ready-stained and pre-lacquered panels are also available.

Standard panel sizes
1200mm x 600mm

Standard panel thicknesses

- 9mm or 12mm for continuously supported floors
- 15mm or 18mm for timber joist floors, subject to loading considerations

Fixing tips

As constructional floors, but with special attention to secret nailing/screwing techniques.



As Birchfloor panels have decorative faces and machined tongue and groove edges, it is important to protect them from on-site damage. Consider laying after all construction work, and as much decorating as possible, is completed.

For protection from dirt and wear, varnish/lacquer the panels with a sufficient thickness of wear-resistant product (BonaTech Traffic, for example) prior to laying.

The reverse of the panel, as well as the face, must be sealed so as to keep the panel in a balanced condition – particularly important for floating floors.



concrete solutions.



Spruce plywood is ideal for concrete formwork because of its strength and rigidity, and can be re-used several times if appropriate care is taken.

For more specialist work, there is a wide range of plywood panels specially coated on both faces with phenolic films. The panels can be easily removed once the concrete has set, oiled and cleaned ready for further use.

With good site practice, a birch or spruce shutter faced with phenolic film, can be used up to 50 times, providing an economical solution for repetitive concrete casting jobs.



Standard panel sizes

2400mm x 1200mm	3600mm x 2440mm
2400mm x 1220mm	3600mm x 2500mm
2400mm x 1250mm	3600mm x 2700mm
2400mm x 1500mm	3600mm x 3000mm
2400mm x 1525mm	3600mm x 3050mm

Standard panel thicknesses

From 6.5mm to 27mm

Applications

Birch faced coated plywood: use in concrete formwork where a smooth surface and high strength are required.

Spruce faced coated plywood: use for less demanding concrete loose panel shuttering – mainly slabs, where the high strength and smooth surface of birch isn't necessary.

plywood packaging.



Spruce plywood is used to produce packing cases in many industries, where the light weight of plywood sheets can lead to a weight saving of up to 50%, translating into lower transport costs from increased cargo capacity and reduced fuel consumption.

The panels are easy to work and can be made into durable transport crates, cargo containers and protective panels for special packaging needs.

It is a safe and clean material for packaging, transporting and storing food products, as well as being environmentally-friendly, from sourcing to recycling.



Specially coated plywoods can be used for flight cases, instrument boxes and many other heavy-duty re-usable packaging solutions, combining maximum strength with minimum weight.

A range of colours offers enhanced appearance of cases and boxes, improving product and company image.

Advantages of plywood packaging

- Elimination of damage caused by inadequate packaging
- Durability and light weight mean improved transportability
- Protection from dirt, moisture, frost, rain and sunlight
- Safe and hygienic in foodstuffs transportation; complies with BS 3755:1964 (Sensory Evaluation of Odour and Flavour in accordance with British standards)
- Resistant to most common chemicals and non-corroding
- Wide choice of dimensions and thicknesses
- Environmentally-friendly



speciality plywood.

There is a comprehensive range of plywoods manufactured with specialist uses in mind. Some of these are featured here.



Phenolic faced plywood

These are panels coated with phenolic resin laminate and imprinted with hexagonal patterns. The smooth-faced film plywoods are generally used in concrete applications, and the imprinted pattern laminates in a variety of industrial applications, such as factory floors, trailer floors, etc. (see further examples following).



Wire pattern

Panels are coated with dark brown phenolic film with an imprinted wiremesh pattern. They are commonly used in the vehicle manufacturing industry and for quality scaffolding platforms in the construction industry.



Laminated

Panels are coated with brown laminate with an imprinted pattern. They provide hard wearing floor panels and are widely used in the transport industry as trailer floors etc.

Painted overlay

Birch or combi panels with a painting paper overlay. Can be used for vehicle sides, walls, doors, traffic signs and building façades, which are designed to be painted.



White laminates

Birch or combi plywood, coated with special white laminate, resistant to chemicals and ultra violet rays. For use as signposts and advertising boards.



Die boards

Special birch plywood, designed for the die cutting industry. Excellent dimensional stability and fine grain make them widely used for laser cutting.

Craft plywoods

Made in a variety of qualities, with thicknesses ranging from 0.4mm to 12mm.

Aircraft plywood – Quality 1

Thin veneers for aeroplanes etc.



Thin birch plywood – Quality 2

Used where surfaces are visible e.g. musical instruments, boats, ships, models.



Thin birch plywood – Quality 3

Used where surfaces will be painted or lacquered – toys, models, shaped objects, sports gear and caravans.



Special strength

Used for objects that require special bending strength, like drums, hockey sticks, canoes etc.





innovation in plywood.

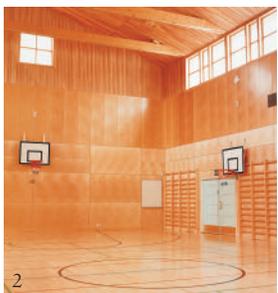


This guide describes many of the different structural and decorative uses for plywood. But it can also be used in innovative ways, with many and varied opportunities for architects, builders, specifiers and planners.

Panels cannot only be supplied in standard sheets, but ready machined into custom shapes and pre-drilled to order.

Lintsiburger hamburger restaurant

The birch plywood dome-shaped roof of this hamburger restaurant built in Helsinki in 1999 was the first of its kind in the world.



Heinävaara primary school

The lining of the assembly hall consists of both smooth and perforated WISA-Birch panels, selected for their excellent acoustic qualities, as well as structural strength and aesthetic appearance.

Sibelius Hall, Lahti

Completed in 2000, this Finnish conference and congress centre is something of a showpiece for decorative and technical plywood solutions, incorporating over 18,000m² of plywood.



1&4 Lintsiburger hamburger restaurant, 2 Heinävaara primary school, 3 Sibelius Hall.

for more information.



Two of the largest manufacturers of Finnish plywood, the UPM-Kymmene Group, with its Schauman organisation, and the Finnforest Corporation, as part of the Metsaliitto Group, have complete ranges of leaflets and specification sheets giving detailed information about all the plywoods described in this leaflet.

Their information also includes highly technical publications designed for architects, structural engineers, planners and local authorities, as well as their counterparts in the construction and general industries.

Our thanks go to these two organisations for their help and for use of their material in compiling this publication.

For more information on their products, please contact:

UPM-Kymmene Wood Ltd

Stags End House
Gaddesden Row
Hemel Hempstead
HP2 6HN
Tel: 01582 794661
www.wisa.com

Finnforest UK

The Heights
59/65 Lowlands Road
Harrow on the Hill
Middlesex HAI 3AE
Tel: 020 8420 0777
Fax: 020 8422 9369
www.finnforest.com

Bona Kemi

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Stony Stratford
MK11 1BY
Tel: 01908 567800
www.bona.com

Osmose

Fieldhouse Lane
Marlow
Bucks SL7 1LS
Tel: 01628 486644
Fax: 01628 476757
www.osmose.co.uk

Arch Timber Protection

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Castleford
West Yorkshire
WF10 2JT
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Fax: 01977 714001
www.archchemicals.com