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- ▶ *Timber cladding is an attractive, functional finish for building exteriors*
- ▶ *This note outlines species selection and availability, moisture content, fire restrictions, profiles, fixing, detailing and finishing in Ireland.*
- ▶ *Careful attention must be paid to these specifications if timber cladding is to perform satisfactorily.*

## Cladding

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### General

Timber cladding is now widely used as an attractive and functional finish to the exterior of buildings. It has been used in many parts of the world for centuries and has proven longevity and durability when correctly detailed and installed. In Ireland, there are many examples of cedar cladding still in good condition after 40 years or more. It is extremely versatile and can be given a wide range of finishes. It is now enjoying increased popularity in Ireland on a wide range of buildings, both domestic and commercial.

Timber is an environmentally sound material which is renewable and is increasingly sourced from sustainably managed forests, particularly those of softwood and temperate hardwood species. However, if timber cladding is to perform satisfactorily, careful attention must be paid to the correct specification, including detailing, selection of species and finishes.

This COFORD Connects Note gives basic information on cladding. Further information is given in the Woodspec manual.<sup>2</sup>



Figure 1: Board on board cladding at Coillte Headquarters.

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<sup>2</sup> Woodspec - a guide to designing, detailing and specifying timber in Ireland is published by the Wood Marketing Federation, tel: +353-1 2980162, email: [itta@indigo.ie](mailto:itta@indigo.ie)



Figure 2: Traditional (late 1800s) and modern cladding, Riga, Latvia.

## Timber species and availability

A wide range of species, both hardwoods and softwoods, is available and suitable for cladding. Table 1 lists the species most widely available in Ireland.

It has been common practice here to specify cladding boards to be free of knots but if a knotty or ‘rustic’ appearance is required *BS 1186 Part 3* gives guidance on grading requirements.

## Moisture content

Timber expands or contracts in response to changes in moisture content; movement in length is negligible and can be ignored. To minimise movement, the moisture content of external cladding boards should generally be  $18 \pm 2\%$  at the

time of fixing. The use of an appropriate finish further reduces movement.

## Fire restrictions

Untreated timber (over  $400 \text{ kg/m}^3$ ) has a surface spread of flame of Class 3. The Technical Guidance Documents to the Building Regulations require that timber cladding is not fixed within one metre of a party wall or boundary unless treated to achieve Class 0 spread of flame. Some other restrictions for multi-storey buildings also apply but in general timber cladding at least 9 mm thick is acceptable under the regulations. Cavity barriers may also be necessary in certain locations. See Technical Guidance Document B of the Building Regulations, Part B4, Table 4.1.

## Profiles

TG&V, Shiplap or square-edged board on board are the most widely used profiles. For most species a minimum thickness of 25 mm is recommended, but stable species such as western red cedar can be used at 18 mm. A typical width is 100 mm, but widths should not exceed 125 mm.

Boards can be fixed either horizontally or vertically. They are normally given a planed or moulded finish but can also be used with a sawn surface where a textured finish is desired.

Square-edged boards may be used horizontally as a rain screen, with 4-10 mm spacing, or as a brise-soleil or

Table 1: Cladding from species most widely available in Ireland.

Species	Natural Durability*	Treatability+	Colour	Remarks
Douglas fir/Oregon pine	3-4	2-3	Reddish brown	May incorporate sapwood.
Larch	3-4	2	Yellowish brown	May incorporate sapwood.
Scots pine/Red deal	3-4	1	Yellowish brown	May incorporate sapwood.
Norway spruce/White deal	4	3	White	May incorporate sapwood.
Western red cedar	2	3	Dark red	Normally free of sapwood.
Iroko	1-2	1	Yellow-brown	Normally free of sapwood.
European oak	2	1	Pale brown	May incorporate sapwood unless specially selected.
American white oak	2-3	2	Pale brown	May incorporate sapwood.

\* According to EN 350-2 ‘Durability of wood and wood-based products – Natural durability of solid wood’, for heartwood, on a scale from 1 (most durable) to 5 (least durable) The sapwood of all species is not durable and must be treated for external use, as should species rated from 3-5.

+ According to EN 350-2, 1 is most permeable; 3 least permeable.

Where non-durable species are used, or where sapwood is included, the boards should be treated to hazard class 3A by the appropriate pressure or double-vacuum methods.

louvers. The edges of the boards should be bevelled to shed rainwater. Figure 3 shows both a rain screen and cladding.

## Fixing

Cladding boards are normally fixed to preservative treated softwood battens, which in turn are fixed to the face of the building. The battens allow ventilation to the rear of the cladding and ensure that any rain that penetrates the joints can escape. Where cladding is vertical, counter battens are used to provide such ventilation in a vertical direction. Fixing of cladding is normally with nails, preferably ring-shanked or serrated to provide additional grip, allowing a 1 mm gap between boards to accommodate movement. The nails should be either of stainless steel or silicon bronze. Mild steel or galvanised nails should never be used as there is a danger of staining the wood surface (Figure 4), particularly with acidic timbers or those containing tannin, such as oak.



Figure 3. Sports centre, Dublin City Council, Cabra.



Figure 4. Staining in iroko from mild steel nails.

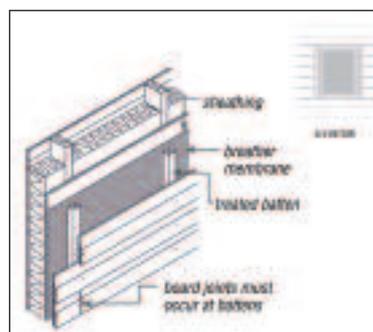


Figure 5: Typical detail for horizontal boarding of vertical battens (from Woodspec).

## Detailing

Boards should be fixed so as to protect the end-grain, with cover slips at external corners. Section B8 of Woodspec gives further details for such protection at corners and window reveals (Figures 5 and 6).

End joints of boards should be butted on to battens for support, with pre-drilling for fixings to prevent splitting of the end grain, particularly with the denser hardwoods. Cladding should stop a minimum of 150 mm from ground level to avoid splashing and discolouration. Stainless steel insect mesh should be provided to the top and bottom of cavities.

## Finishes

Most cladding is given a decorative finish. In Irish conditions, with wind-driven rain and high humidity, clear finishes such as varnish or oil-based products have a short life (1-2 years maximum), are difficult to re-finish and are best avoided (Figure 7). Pigmented micro-porous finishes have performed well and, if correctly applied, can give a long life (5-7 years) before re-coating is necessary. These are available in a wide range of colours. All surfaces should receive at least one coat before fixing, and end-grain should be well sealed after all trimming is complete. Micro-porous paints, as widely used in Scandinavia, are also suitable but are rarely used here (Figure 2).

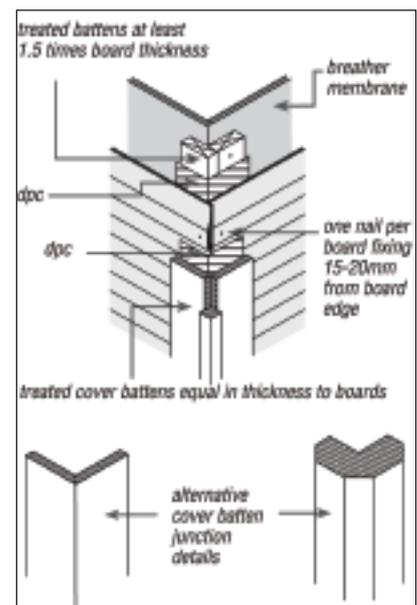


Figure 6: Typical detail for horizontal boarding at corners (from Woodspec).

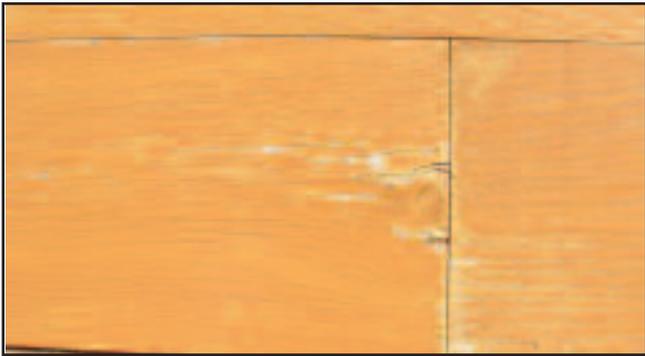


Figure 7: Coloured varnish on oak peeling after 18 months exposure.

Unfinished boards, particularly of Western red cedar, will weather naturally to a silvery-grey colour which can be very attractive. It should be borne in mind, however, that the rate at which this weathering will occur will depend on exposure and orientation, with protected areas such as soffits or overhangs remaining their original colour long after the more exposed areas have gone grey. If uniformity of appearance is desired, unfinished cladding should be confined to flat facades (Figure 8). In urban areas, pick-up of dirt on unfinished boards can occur, particularly at street level, with deeper staining due to iron particles.

## Current and future developments

Modified woods, both heat treated and acetylated, are starting to become available. In particular, heat treated softwoods are potentially useful for cladding applications and have been used as such in the Netherlands. Heat treatment offers a relatively low cost method of property enhancement which presents no environmental challenges. Fast-grown Irish timber from species such as Sitka spruce



Figure 8: Untreated iroko weathered to a uniform grey – Lough Derg Yacht Club.

and lodgepole pine are presently being evaluated by the University of Limerick for cladding applications. Criteria of interest are long term durability, effects of nail fixing, dimensional stability and colour retention. Initial evaluation has shown significant durability and stability improvement and a large scale nailing trial showed heat treated materials to be slightly less prone to splitting than untreated controls. At present test panels, manufactured from spruce, pine and larch, and using timber that has been heat treated using three different processes, are undergoing outdoor exposure tests. Painted test panels manufactured with heat treated Irish timber are also undergoing exposure trials at the Building Research Establishment (BRE) in the UK as part of that organisation's large scale evaluation of cladding materials. Early indications are that lodgepole pine may have the greatest promise for this application. Figure 9 shows painted and unpainted heat treated Sitka spruce panels under outdoor exposure test at BRE.

## References and further information

COFORD ([www.coford.ie](http://www.coford.ie))

Woodspec ([www.woodspect.ie](http://www.woodspect.ie))

Coillte ([www.coillte.ie](http://www.coillte.ie))

Wood Marketing Federation ([www.wood.ie](http://www.wood.ie))

Arch Timber Protection ([www.archtp.com](http://www.archtp.com))

Osmose (Preservatives and finishes) ([www.osmose.co.uk](http://www.osmose.co.uk))

Department of the Environment (Building Regulations) ([www.environ.ie](http://www.environ.ie))

TRADA ([www.trada.co.uk](http://www.trada.co.uk))

EN 350-2. *Guide to natural durability of selected wood species of importance in Europe.*

BS 1186 Part 3. *Specification for wood trim and its fixing.*

BS 8417. *Preservation of timber. Recommendations.*



Figure 9: Painted and unpainted heat treated Sitka spruce panels under outdoor exposure test at BRE.