CODE OF PRACTICE

FOR THE INSTALLATION OF CELLULAR PVC-U (PVC-UE) ROOFLINE SYSTEMS

(REF: 350/2 JULY 2009)

THE BRITISH PLASTICS FEDERATION

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SECTION ONE - General

1.1 **Scope**, The purpose of this Code is to emphasise the good practice for the successful and safe installation of non-structural cellular PVC-U (PVC-UE) products in roofline.

Design/Application is considered and recommendations given. Repair/Renovation aspects are also addressed and appropriate methods outlined.

For aspects beyond the scope of this code, advice should be sought from the product manufacturer.

1.2 **References**, The titles of the standards publications referred to in this code are listed in Appendix A

1.3 **Definitions**, For the purpose of this code the definitions in BS6100:1989 apply. Terms that are particularly relevant are explained below, together with others not in the standard.

1.3.1 Fascia, A surface covering the ends of rafters or joists at eaves or corners or over a shop front.

1.3.2 Soffit, A horizontal or sloping surface closing the eaves space back to the outer leaf of the building.

1.3.3 Barge Board, A board, fixed to the gable end of a roof to cover the roof timbers.

1.3.4 Cladding, A board system (often ornamental) used as a covering to a structure or to create a deep fascia or soffit.

1.3.5 Roofline, The junction of the eaves and verge of the roof with the walls.

1.3.6 Box End, A construction to enclose the end of an eaves box with or without an adjoining barge board.

1.3.7 Capping, The superimposition of a suitable thickness profile onto existing fascias, soffits and bargeboards.

SECTION TWO – Materials & Components

2.1 **Extruded Cellular PVC-U (PVC-UE), Extruded PVC-U & Injection moulded PVC-U**

The materials used for the successful manufacture of roofline products should be as follows:

2.1.1 Extruded Cellular PVC-U (PVC-UE) profiles manufactured in accordance with BS 7619:2009

(a) Fascia
(b) Soffit
(c) Barge Boards
(d) Cladding (for use as soffits)

2.1.2 Extruded PVC-U profiles manufactured in accordance with manufacturers agreed specifications.

General purpose trims available in a standard length, to cater for plain board and cladding board joints, corners and ends/edges.

2.1.3 Injection mouldings manufactured in accordance with good manufacturing practice.

Purpose made mouldings to cater for joints, corners and end caps.

2.2 **Stainless Steel Fixings**

All fixings should be A4 marine grade and comply with BS EN ISO 3506: 1+2: 1998. Note: The composition of Grade A4 corresponds to austenitic steel 316.

2.3 Timber

Timber for use as support work or battening should be of sound quality and treated as defined in Section 2.7 of this code.

Where the timber substrate is preservative treated with copper/chrome/arsenic care must be taken to ensure that sufficient time is allowed for complete fixation of the preservative (approximately seven days) to avoid corrosion of fixing nails.

Introduced battens and support timberwork should be cut from one of the species listed in appendix B.

Plywood should comply with the requirements of BS 5268–2:2002 and exposed edges shall be treated as in section 2.7 of this code.

2.4 Mortar

Where required mortar verges should be fully stripped and replaced in accordance with BS 5534:2003.

2.5 Sealants

Sealants or adhesives used as sealants shall be of a type recommended by the sealant/adhesive manufacturer as suitable for exterior applications. Typically, Low Modulus Silicone to BS5889 (Type A) or solvent free/moisture cure adhesives.

2.6 Sarking Felt / Underlay

All product should comply with the requirements of BS 747:2000 and be installed in accordance with the Code of Practice for Slating and Tiling, BS 5534: 2003.

2.7 Preservatives / Treatments

Timber should be preserved in accordance with BS 5589:1989.

2.8 Supplementary Fittings

Allied products installed to the roofline area to ensure a complete working system.

2.8.1 Rainwater Goods

Should be manufactured in accordance with BS 4576–1:1989 and comply with the performance requirements of BS 6367, BS EN 607: 2004 and BS EN 12200: 2000.

Installation of rainwater goods should be carried out in accordance with the manufacturer’s recommendations.

2.8.2 Flue Vents

Adequate clearance should be allowed between the flue and the roofline products to comply with current Building Regulations.

2.8.3 Other Supplementary Fittings

Fittings that apply loads e.g., telephone lines and TV aerial brackets, should not be fixed directly to Cellular PVC-U (PVC-UE) products.

SECTION THREE - Design

3.1 Weather Resistance

Design in accordance with the minimum requirements of this code will ensure that the roofline area is weather resistant.

3.2 Structural Stability

All fixings must be capable, when used in accordance with manufacturers instructions and other relevant building Codes of Practice, of accepting imparted loads through climatic or other anticipated loadings (refer to BS 6399-2: 1997).

3.2.1 Battens and Support Timberwork

Battens and support timberwork should be constructed in accordance with good working practice. They should be rigid and have sufficient width and depth to avoid splitting on penetration of fixings.

3.3 Condensation and Ventilation

Condensation occurs when warm moisture laden air meets a surface the temperature of which is below the dew point of the air.

3.3.1 Ventilation

Provisions for adequate ventilation should be allowed for in order to satisfy Approved Document C2 - Building Regulations 2004 and fully comply with the recommendations of BS 5250: 2002 – Code of Practice for the Control of Condensation in Buildings.

3.4 Durability

Installations carried out in accordance with the recommendations of this Code can be regarded as having a Reference Service Life of 35 years as specified in the BRE Green Guide 2009. Durability may be influenced by climatic conditions and by atmospheric pollution.

3.4.1 Timber

All new timber must be pre-treated with preservative according to section 2.7 in order for it to have an adequate life.

3.4.2 Fixings

A4 Grade stainless steel is intended to give "high performance" corrosion resistance.

3.5 Fire Resistance

There are currently no regulatory controls for the fire resistance of Cellular PVC-U (PVC-UE) Roofline profiles.

The manufacturer should assess fire performance in accordance with BS 476–7:1997, Fire Tests on Building Materials and Structures - Method of test to determine the Surface Spread of Flame of Products. Performance is reported as a classification ranging 1–3, with Class1 being the best achievable.

3.6 Quality

Cellular PVC-U (PVC-UE) materials must be manufactured in accordance with BS7619: 2009 and manufacturers should have a valid KiteMark approval to this standard.

3.7 Environmental

Cellular PVC-U (PVC-UE) roofline and cladding profiles have the potential to last the lifetime of the building without the need for maintenance. Maintenance is costly and creates CO2. At the end of their lifetime they can easily be removed and fully recycled. Recycling PVC into new products requires significantly less energy than manufacturing from new. In addition PVC can be recycled many times over.

Under the Code for Sustainable Homes, Cellular PVC-U (PVC-UE) roofline products qualify for 1.5 points as Tier 3 products in the section dealing with Responsible Sourcing of Finishing Elements.
Note
Tier 3 products are those where both the manufacturer and the major raw materials supplier are ISO14001 certified.

SECTION FOUR – Application

4.1 General

To achieve a successful and safe installation, it is essential to ensure that products are fixed to a sound, rigid substrate (refer to section 3.2).

It is recommended that total replacement rather than capping of existing timbers be adopted where possible. By capping and effectively sealing moist and perhaps already rotten timber, an environment which is more conducive to fungal attack may result. The capping board will tend to 'insulate' the rot and promote conditions whereby the fungus can multiply and potentially spread to adjoining roof timbers.

4.1.1 Access

It is recommended that full scaffold platform or purpose made deck system including guard-rails is used on all installations. Where ladders are used for access these should always be secured and fully supported. (See Section 6)

4.1.2 Survey/Preparation

To be carried out after removal of redundant materials and before installation of Cellular PVC-U (PVC-UE) products.

Inspection of existing timbers or rafters is important. Any defective timber should be replaced or treated in accordance with BRE digests 299 and 345 and/or Section 2.7 of this Code.

Sarking felt should be examined and replaced if damaged. Alternative materials/products are available to ensure complete eaves protection/renovation. However, where traditional sarking felt is to be reinstated the existing material should be cut back to sound material. The new material should be installed and lapped in accordance with Table 1 to facilitate the uninterrupted passage of water into the gutter.

Where the survey identifies asbestos containing materials, analysis and removal by authorised operatives is recommended. See 6.2.3 of this code.

Rafter feet and framing members should be cut in line or packed to ensure alignment of the replacement Cellular PVC-U (PVC-UE) products.

Where the chosen fascia profile is not load bearing eaves tilting fillets should be set vertically proud of the fascia top edge, to allow the roof covering to over sail the fascia, as defined in BS 5534 : 2003. The loading imparted by the eaves course of roof tiles may then be borne by the tilting fillets.

Additional support timberwork is required on fascias if projecting more than 50mm below the line of rafter feet, or supporting timberwork.

4.1.3 General Fixing Specification

Sizes of fixings are to comply with Table 2. Experience has shown these to be adequate in most circumstances; however the manufacturers recommended guidelines should also be consulted.

4.1.3.1 **Soffit:** The appropriate profile should be rigidly fixed to suitable timberwork at centres not exceeding 600mm in length and 300mm across the width, with fixings detailed in Table 2. If necessary, additional support timberwork should be constructed to hold boards solid and level.

4.1.3.2 **Fascia:** (Total Replacement - Direct to Rafters) the appropriate profile should be fixed to rafter feet or support timberwork at centres not exceeding 600mm with fixings detailed in Table 2.

4.1.3.3 **Fascia:** (Capping Existing or Introduced Support Timber) if this method of installation is required particular attention should be paid to the condition and treatment of the existing substrate. The appropriate profile should be fixed to support timberwork at centres not exceeding 600mm with fixings detailed in Table 2.

4.1.3.4 **Barge Board Soffits:** The appropriate profile should be rigidly fixed direct to gable ladder or noggin at centres not exceeding 600mm in length and 300mm across the width, with fixings detailed in Table 2.

4.1.3.5 **Bargeboard:** (Capping or Direct to Gable Ladder) the appropriate profile should be fixed as in 4.1.3.2 or 4.1.3.3.

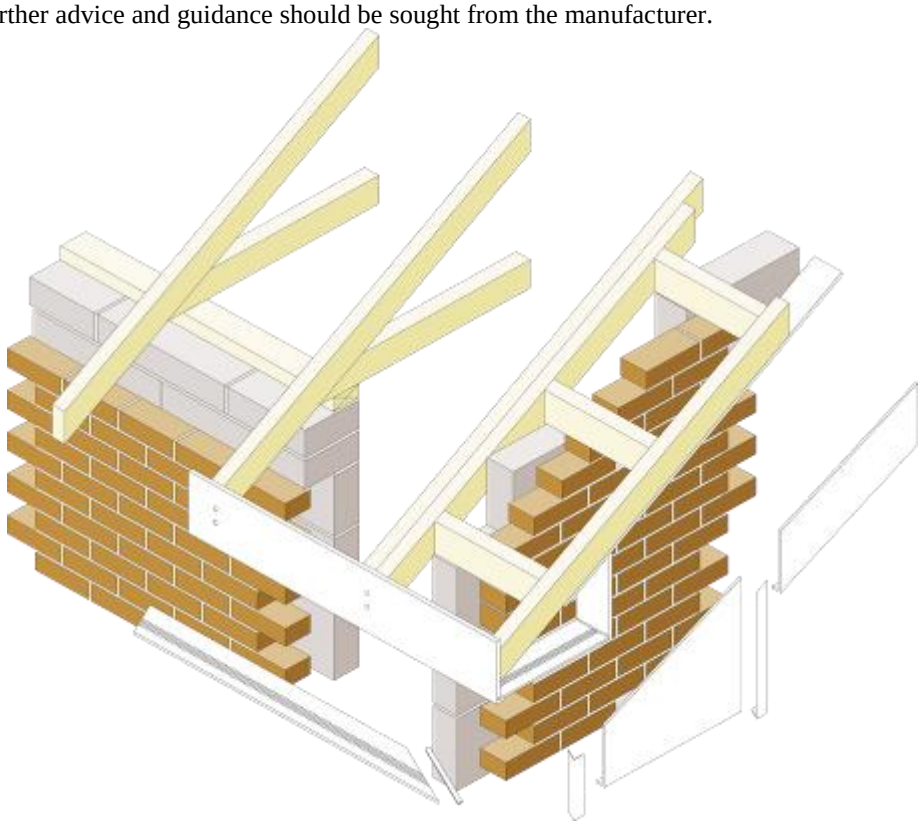
4.1.3.6 **Cover Joints, Corner Joints and Inline Joints:** Can be made either on or between the rafter feet or support timber depending on the profile. Joints should allow an expansion gap and be covered with an appropriate moulding in accordance with the manufacturer instructions.

Ridge joints can be made using an appropriate trim, with the boards cut to the required angle.

Soffit boards should be jointed using an appropriate trim allowing the manufacturers recommended expansion gap at each board end.

4.1.3.7 **Gutter Fixing:** PVC-U gutters, as specified in BS 4576-1:1989(1998), may be screw-fixed directly to load bearing fascia boards. Gutter bracket spacing's must not exceed 1 m; reduced spacing's are recommended in the Scottish Highlands. Other lightweight gutters may also be screw-fixed to the board provided the maximum bracket loading, covered in BS 4576-1: 1989(1998), is not exceeded.
Further advice and guidance should be sought from the manufacturer. Fixings should be as described in Table 2.

4.1.3.8 **Box End Detail:** There are numerous techniques for constructing box ends; for convenience the use of larger double-ended profiles and mouldings should be considered to minimise joints, fixings and potential water trap details. Further advice and guidance should be sought from the manufacturer.



4.2 Sequence of Installation

4.2.1 **Fascia:** Total Replacement Direct to Rafters

- Ensure the correct access (scaffolding/tower) system is used and the statutory health and safety procedures (CDM) have been adhered to.
- To allow access to the roof void and inspection of substrate it is recommended that the first two courses of tiles should be taken up and set aside. Alternatively, where possible and to minimise disruption these may be pushed back beyond the work area. Where slate roof tiles are found it is not recommended that these be removed unless positive re-fixing can be achieved.
- Remove existing fascia / soffit system.
- Cut back damaged roofing felt, remove debris i.e. birds nests and generally clean-up work area.
- Inspect rafter ends and roofline timbers for decay. Cut out all decayed timbers and splice in (scarf joint) new treated timber bearers. Treat rafter ends with preservative.
- Where required install adequate soffit supports. Either new treated timber bearers or proprietary soffit channel.
- Ensure rafter ends and soffit bearers are straight and level with a string line.
- Fix soffit ensuring fixings are in accordance with 4.1.3.1and it is straight and level.
- Fix fascia system ensuring fixings are in accordance with 4.1.3.2 and it is straight and level.
- Fix rainwater system ensuring fixings are in accordance with 4.1.3.7.
- Install eaves protection system on top of fascia and/or renew sarking material to provide a weather tight surface draining into the gutter.
- Clean and replace tiles.
- Clean fascia and soffit system with a mild non-abrasive detergent and water.
- Remove scaffolding and/or tower system and leave site clean and tidy.

4.2.2 **Bargeboard:** Direct to Gable Ladder

- Ensure the correct access (scaffolding/tower) system is used and the statutory health and safety procedures (CDM) have been adhered to.
- Remove existing box-end system, bargeboard and bargeboard soffit taking care not to disturb/destroy tile under cloaking. If in doubt, best practice is to remove verge tiles and under cloaking and replace on completion.
- Inspect timbers and treat with preservative. Remove and replace any decayed timber with new treated timber.
- Install treated timber bearers to locate box-end section.
- Install treated timber soffit bearers and noggins if required for bargeboard soffit.
- Fix bargeboard soffit ensuring fixings are in accordance with 4.1.3.4.
- Fix bargeboard ensuring fixings are in accordance with 4.1.3.5.
- Finish joint at the bargeboard apex with a finial or joint trim cut to suit.
- Cut and fix a wide board to suit the area between fascia, barge soffit and bargeboard (Box End Piece).
- If required, replace tile under cloaking and re-bed verge tiles in new mortar.
- Clean bargeboard and soffit system with a mild non-abrasive detergent and water.
- Remove scaffolding and/or tower system and leave site clean and tidy.

4.2.3 Capping Existing Timber

Installation follows the same procedure as 4.2.1 and 4.2.2 after a thorough inspection and repair/replacement of the existing substrate. See 4.1 of this Code.

4.2.4 Over Fascia Venting and Eaves Protection systems.

When over fascia venting is used ensure that the height of the ventilation section (nominally 19-25mm) has been subtracted from the top of the new fascia. This will ensure the tiles are repositioned in the original plane after the over fascia ventilation section has been fixed to the top of the fascia.

If eaves protection is used, ensure it is fixed to the top of the fascia with stainless steel nails at maximum 300mm intervals. The rear waterproofing section of the trim should fit beneath the existing sarking felt with a minimum overlap of 150mm. The drip section should adequately dress into the rainwater system. Where installed ensure tilting fillets or sprockets do not obstruct the over fascia ventilation system.
Check silicone sealant or sealing tape has been used between overlapping eaves protection joints.

4.3 Mistakes to avoid

- Do not fix at extremes of temperature. Refer to manufacturers recommendations.
- Do not spring boards in between two fixed points i.e. abutments; previously fixed planks.
- Do not exceed maximum fixing centres.
- Do not fix to insecure substrates.
- Do not use incorrect fixings.
- Do not omit expansion gaps.

4.4 Final inspection – things to look for

- Check board alignment from ground level. Boards should be straight, level and true. If any of the components are out of alignment it could indicate that a) the rafters have not been levelled correctly or b) there are insufficient timber support bearers.
- Ensure the correct fixing centres are specified (600mm maximum) and two fixings are used to locate the board.
- Fixings should be flush to the board and spaced correctly across the width of the board.
- Ensure appropriate corner and joint trims have been used.
- Ensure there is an adequate expansion tolerance inside corner and joint trims.
- The product should be clean and free from damage.
- A small amount of low modulus silicone should be used as general intersection sealing.
- Trims should be fixed with low modulus silicone sealant. If adhesive/glue's are used this should be to one side of the trim only to allow movement due to expansion and contraction.

SECTION FIVE - Repairs and renovations

5.1 General Maintenance

Cellular PVC-U (PVC-UE) profiles are self-finished and low maintenance. Occasional washing with a non-abrasive mild detergent and water is beneficial in removing surface grime and maintaining a pristine appearance, especially in heavily polluted atmospheres. Care should be taken to flood the surface when cleaning to prevent scratching of the surface.

In common with other plastic based materials solvents should not be used for cleaning.

Exercise care to prevent contact with, and staining by creosote or bitumen-based products. Other common building materials are easily cleaned off without damage.

As with all PVC products, paint can adversely affect the impact strength of PVC sections, and the application of dark colours may lead to risk of thermal distortion.

5.2 Surface Treatments

Prior to any surface repair advice should be sought from the manufacturer regarding continuity of guarantees.

5.2.1 Scratches and Small Abrasions

Starting with 180 grit wet and dry on a block of wood, keep the paper wet at all times to prevent clogging. Move along the profile until all the scratches have been removed.

Wash the surface of the board to remove any 180 grit remaining and then repeat the exercise with 360 grit and 1000 grit wet and dry washing the surface after each application.

Give the board a final wash with clean water, removing all traces of grit and polish the whole board with a proprietary household, non-abrasive cream cleaner.

5.2.2 Large Scratches and Gouges (less than 3mm deep)

Remove any raised areas level with the board surface using medium glass paper.

Score the surface of any indentation with skin intact and fill the damaged area with automotive type body filler.

Repeat as 5.2.1 and finish, where appropriate with a good quality satin finish polyurethane paint. Dark colours are not recommended for use externally.

5.3 Replacement Procedures

Boards can be replaced by releasing any fixings, the use of a slide hammer with appropriate claw attachment will help to prevent damage, and cutting where necessary, to facilitate removal.

SECTION SIX - Safety and Precautions

6.1 General

The following notes are set out as guidance to all trades who are required to work on or over a roof at any period during its construction, and at any time after completion, for the purposes of repair and maintenance. Attention is drawn to the Health and Safety at Work Act 1974, which applies to the employer, employee and the self-employed.

6.2 Safety

6.2.1 Regulations

The Construction Regulations made under the Factories Act 1961 comprise The Construction (General Provisions) Regulations 1961, The Construction (Lifting Operations) Regulations 1961, The Construction (Working Places) Regulations 1966 and The Construction (Health & Welfare) Regulations 1966

Particular attention is drawn to Regulations 35 and 36 of The Construction (Working Places) Regulations 1966, which lay down requirements for the protection of persons who work on sloping roofs and on or near fragile materials.

6.2.2 Access

Where a person liable to slip or fall more than 1.98m from the lower edge of a sloping roof, a barrier should be provided at that edge to prevent such a fall. Alternatively, the work should be done from a securely supported working platform, which is not less than 440ram wide and is fitted with guard rails and toe boards. The Regulations also require precautions to be taken when access ladders are used. These requirements are given in Regulations 31 and 32 of the Construction (Working Places) regulations 1966. The requirement to secure ladders should be particularly noted.

Guidance on the erection and use of scaffolding is given in BS 5973.

6.2.3 Handling and Cutting Asbestos Products

The use of asbestos and asbestos containing products is controlled by the Asbestos Regulations, 1969. The Regulations require that any dust liberated during the handling and working of these products should be maintained at a low level

In all circumstances it is recommended that clarification should be sought from the local office of H M Inspectorate.

6.3 Precautions

Access ladders to scaffold/towers should extend and project not less than 1.07m above the landing.

TABLE 1: Recommended horizontal laps for underlay

RAFTER PITCH	MINIMUM HORIZONTAL LAP	
Degrees	Not fully supported (mm)	Fully supported (mm)
12.5 to 14	225	150
15 to 34	150	100
35 and above	100	75

The information above is in accordance with BS 5534:1978 - Code of Practice for Slating and Tiling, which should be referred to for further information.

TABLE 2: Recommended fixings for Cellular PVC-U (PVC-UE) Roofline Systems

COMPOSITION	A4 STAINLESS STEEL (BS 6105)				
APPLICATION	FASCIA AND BARGEBOARD		SOFFIT		GUTTERS * 1 + 2
TYPE	ANNULAR RINGED SHANK NAILS	SCREW	ANNULAR RINGED SHANK PINS	SCREW	SCREW
MIN. DIAMETER	2.65mm	3.5mm	2.0mm	3.5mm	3.5mm
PLASTIC/STEEL HEAD DIAMETER	10mm	10.5mm	6.0mm	10.5mm	8.0mm
MINIMUM PENETRATION INTO SOUND TIMBER	40mm	30mm	30mm	30mm	30mm
AVAILABLE LENGTHS	50,65mm	40,50,65mm	30,40mm	40,50,65mm	Standard increments

NOTES:- Each plank to be fixed with a minimum of 2 fixings at 300mm maximum centres across the width and 600mm maximum centres along the length.

*1. Number used according to gutter system manufacturers instructions
*2. Provided minimum penetration requirement is met, gutter bracket fixings can provide one of the fascia fixings.

APPENDIX A

LIST OF STANDARDS AND RELEVANT DOCUMENTS

BS 476-7:1997	Method of classification of the surface spread of flame products
BS 607:2004	Eaves gutters and fittings made from PVC-U
BS 747:2002	Specification for roofing felts
EN 3506-1+2:1998	Mechanical properties of corrosion resistant stainless steel fastners
BS 4016:1997	Specification for building papers (breather type)
BS 4576-1:1998	Unplasticised polyvinyl chloride (PVC-U) rainwater goods and accessories
BS 5250:2002	Code of practice for control of condensation in buildings
BS 5268-2:2002	Structural use of timber
BS 5534:2003	Code of practice for slating and tiling
BS 5589:1989	Code of practice for the preservation of timber
BS5889 (Type A)	Specification for one part gun grade silicone based sealants
BS 5973	Code of practice for access and working scaffolds and special scaffold structures in steel
BS 6100:1989	Glossary of building and civil engineering terms
BS 6105	Specification for corrosion-resistant stainless steel fasteners
BS 6367	Code of practice for drainage of roofs and paved areas
BS 6399-2: 1997	Loading for buildings, Code of Practice for wind loads
BS 7619:2009	Specification for extruded cellular Unplasticised PVC profiles
BS 8200:1985	Code of practice for design of non-load bearing external vertical enclosures of buildings
BS EN 12200:2000	Specification for pipes, fittings and the system
EN 20105-A02	Methods of test for colour fastness of textiles and leather
ISO 14001	Environmental Management Standards

BRE DIGESTS 299 and 345
BRE Green Guide 2009

Health and Safety at Work Act 1974

Factories Act 1961
The construction (Working Places) Regulations 1966
The Construction (General Provisions) Regulations 1961
The Construction (Health and Safety) Regulations 1966

Asbestos Regulations HSE 1969

Building Regulations - Approved Document C2
CDM Regulations

NHBC Chapter 6.2:1992

APPENDIX B: Timber species suitable for use as structural timbers

Douglas fir

Larch

Scotch pine

Corsican pine

European spruce

Hemlock

Southern pine

Sitka spruce

Redwoods