

Chapter 3.3



Timber preservation (natural solid timber)

This chapter gives guidance on meeting the Technical Requirements for the protection of natural solid timber against fungal decay and insect attack, dependent upon its use.

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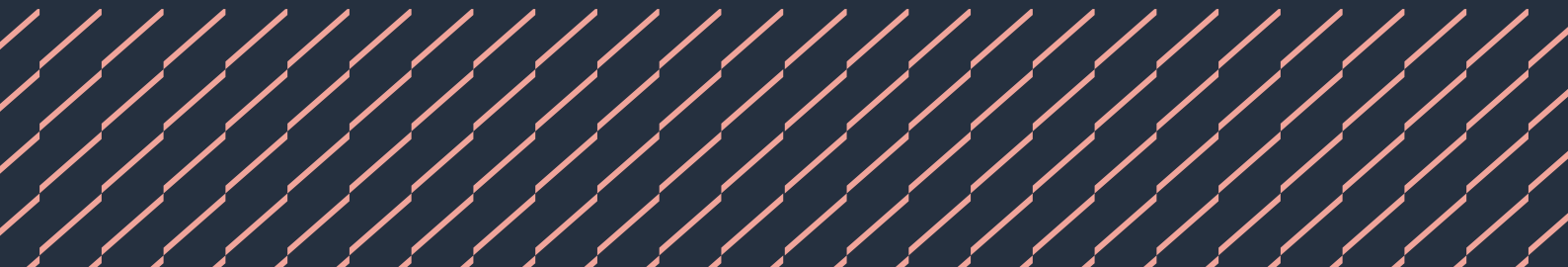


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Definitions for this chapter

For the purposes of this chapter, the following definitions apply:

Coated/coating	Application of a suitable water-repellent decorative surface coating, such as a paint or stain, which must be maintained over the life of the component. The application of a surface coating should be in addition to the use of factory-applied preservative treatments or timber with adequate natural durability appropriate for the intended application.
Desired Service Life	The period over which a component can function as it was intended. A Desired Service Life is indicative rather than a guarantee of performance and is based on an assumption of good design and maintenance in service.
Durability Class	<p>Durability Classes are systems of determining and classifying durability of wood species or wood-based materials to various wood-destroying organisms based on test methods described in relevant European Standards. Durability Classes are defined in BS EN 350 along with durability ratings of commonly available wood species. The following grade scales are used depending on the destroying organisms:</p> <ul style="list-style-type: none"> • A five-grade scale (Durability Class 1-5) for decay basidiomycete fungi and soft rotting micro-fungi (Table 1 of BS EN 350 and expanded in Table 2 of this chapter) • A two-grade scale (Durability Class D and S) for wood-boring beetles — <i>Hylotrupes bajulus</i>, <i>Anobium punctatum</i>, etc (Table 2 of BS EN 350) • A three-grade scale (Durability Class D, M and S) for termites and marine organisms (Tables 3 and 4 of BS EN 350).
Durability to biological agents	Inherent resistance of a wood species or a wood-based material against wood decay organisms.
Engineered wood products	Engineered wood products such as glue-laminated timber, laminated veneer lumber, I section and metal-web studs, joists and rafters, etc should either have adequate natural durability or be preservative treated following the guidance in this chapter.
Heartwood	Inner zone of wood that, in the growing tree, has ceased to contain living cells or to conduct sap.
Modified wood	<p>Wood modification (not to be confused with preservative treatment) is the industrial processing of timber using thermal or chemical processes to enhance the natural durability of a timber species. Examples of wood modification include thermal treatment (not kiln drying) and acetylation.</p> <p>The modified wood manufacturer should confirm the Durability Class of the product and provide information on its handling, processing and use.</p> <p>Modified wood and modified wood-based materials should be assessed in accordance with Technical Requirement R3.</p>
Preservative treatment	Treatment with a chemical substance to improve resistance to fungal decay and/or wood destroying insects. Application of preservative treatments is an industrial process normally carried out using a combination of pressure and vacuum in a treatment vessel (industrial spray and dip treatments may also be suitable for certain applications). The pressure, duration, formulation, and timber species used will offer varying levels of protection. Further guidance on treatment specifications can be found in BS 8417. Treatment specifications should be suitable for the Use Class and Desired Service Life combinations set out in Table 1.
Sapwood	Outer zone of wood that, in the growing tree, contains living cells and conducts sap. The sapwood of all wood species is considered non-resistant against decay fungi unless other data are available.
Service Class	<p>The Service Class system is intended for use when assigning strength values and calculating deformations under defined environmental conditions for timber components and wood-based materials.</p> <p>A structural engineer will need to specify and consider the Service Class of a timber component when undertaking structural designs and calculations. Further guidance on Service Classes can be found in BS EN 1995-1-1.</p>
Solid external wall	A single leaf of masonry without a cavity forming an external wall.

Use Class	<p>Based on differences in environment exposures that can make wood or wood-based products susceptible to biological deterioration. Table 1 of BS 8417 summarises the Use Class system and gives examples of typical service situations. BS EN 335 contains definitions of use classes which have been summarised below:</p> <ul style="list-style-type: none"> • Use Class 1: situations in which the wood or wood-based product is inside a construction, not exposed to the weather and wetting • Use Class 2: situations in which the wood or wood-based product is under cover and not exposed to the weather (particularly rain and driven rain) but where occasional, but not persistent, wetting can occur. In this Use Class, condensation of water on the surface of wood and wood-based products may occur • Use Class 3: situations in which the wood or wood-based product is above ground and exposed to the weather (particularly rain). A large variety of in-use situations exist and, when relevant, Use Class 3 may be divided into two sub-classes 3.1/3(c) and 3.2/3(uc) • Use Class 3.1/3(c) coated: in this situation, wood and wood-based products will not remain wet for long periods. Water will not accumulate. This may be achieved by, for example, a maintained and suitable coating • Use Class 3.2/3(uc) uncoated: In this situation, wood and wood-based products will remain wet for long periods. Water may accumulate • Use Class 4: a situation in which the wood or wood-based product is in direct contact with ground and/or fresh water.
Wood species	Trade name according to BS EN 13556 which can on occasion include more than one botanical tree species.

Introduction

This chapter sets out Use Classes, Desired Service Life, preservative treatment and natural durability of solid wood components. It does not cover:

- products such as plywood and wood-based particle boards
- the condition before the treatment
- treatment schedules, formulation and process techniques, which is the responsibility of the organisation carrying out the operation.

3.3.1 Compliance

Also see: Chapter 2.1

Timber preservative treatments and processes shall comply with the Technical Requirements and reasonably ensure that the timber is safely and satisfactorily protected against fungal decay and insect attack for the Use Class and Desired Service Life of the component.

Timber and external joinery should either:

- have adequate natural durability against fungal decay and insect attack, or
- be treated with preservative in accordance with BS 8417 and this chapter.

It is important that treatment of timber and joinery is carried out to appropriate standards which are both suitable and safe. Treatments in accordance with procedures set out in British Standards, Codes of Practice, or which have been satisfactorily assessed by an independent authority in accordance with Technical Requirement R3, will generally be acceptable.

The treatment specification should state the:

- component type, and
- Use Class, and
- Desired Service Life.

The treatment specification may also include the timber species, specific treatment and standard required where appropriate.

Preservatives used in England, Scotland and Wales should meet the requirements of The Biocidal Products (Health and Safety) (Amendment) Regulations 2022 or The Control of Pesticides Regulations (1986 as amended) administered by the Health and Safety Executive. Preservatives used in Northern Ireland should be authorised under the EU Biocidal Products Regulation. The safety instructions published by the manufacturers should be followed.

3.3.2 Durability

Also see: BS 8417, BS EN 350, The Wood Protection Association Code of Practice: Industrial Wood Preservation, The Wood Protection Association Wood Selection Guide

Timber and joinery used in the construction of homes shall either have adequate natural durability or, where treatment is undertaken, receive a satisfactory preservative treatment against fungal decay and insect attack.

The natural durability of heartwood varies between wood species. For some end uses, the natural durability of the heartwood of a particular species may provide sufficient durability to be used without preservation. BS EN 350 defines the durability of commonly available wood species, and The Wood Protection Association Wood Selection Guide and BS 8417 provide guidance on natural durability and preservative treatment appropriate for a specific Use Class and Desired Service Life.

Timber component groups and preservative treatment or natural durability requirements are shown in Table 1 below (based on BS 8417), which provides information to establish the appropriate timber Durability Class or requirement for preservative treatment according to the component and conditions of use.

Preservative treatments should be suitable for the Use Class of a component; not all treatment types are suitable for all Use Classes. Guidance on treatment types and schedules can be found in Table 3 of BS 8417:2024 and by consulting treatment manufacturers or The Wood Protection Association.

Table 2 provides information on the timber species and durability of heartwood to protect against attack from fungal decay. Sapwood is generally regarded as not durable, unless proven otherwise by test data.

Table 1: Timber component groups and preservative treatment

Component group	Examples	Use Class	Desired Service Life	Preservative treatment required ⁽¹⁾	Minimum natural Durability Class in lieu of treatment ^(2,10)
Internal joinery	Architraves, skirting boards, internal doors, etc	1	60	X	5
Floor joists	Intermediate floor joists not built into solid external walls, floor boards	1	60	X	5
	Intermediate floor joists built into solid external walls	2	60	✓	2
	Ground floor joists	2	60	✓	2
Roof timbers	All timbers in normal pitched roofs except tiling battens and valley gutter members	1	60	X	5
	Normal pitched roof timbers in areas with house longhorn beetle (Hylotrupes area) ⁽³⁾	1	60	✓	3
	Tiling battens, wood in pitched roofs with high condensation risk ⁽⁴⁾ , wood in flat roofs, pitched valley boards	2	60	✓	2
Timber frame	External wall frame timbers in timber frame housing (including engineered I-studs and metal-web studs), walls forming dormer windows	2	60	✓	2
	Sole plates ⁽⁵⁾	2	60	✓	2
External joinery and cladding (not in ground contact)	Coated external cladding, joinery (windows and doors, including frames), soffits, fascias, barge boards, etc	3.1 3(c)	30	✓	3
	Uncoated external cladding, joinery (windows and doors, including frames), soffits, fascias, barge boards, etc	3.2 3(uc)	30	✓	2

Component group	Examples	Use Class	Desired Service Life	Preservative treatment required ⁽¹⁾	Minimum natural Durability Class in lieu of treatment ^(2,10)
External timber	Coated open porch and canopy structures ⁽¹²⁾ including support posts ⁽⁶⁾	3.1 3(c)	30	✓	3
	Uncoated open porch and canopy structures ⁽¹²⁾ including support posts ⁽⁶⁾	3.2 3(uc)	30	✓	2
	Coated external timber components integral to the structure of the home ⁽¹³⁾⁽⁶⁾	3.1 3(c)	60	✓	2
	Uncoated external timber components integral to the structure of the home ⁽¹³⁾⁽⁶⁾	3.2 3(uc)	60	✓	1
	Deck boards ⁽⁷⁾	3.2 3(uc)	15	✓	3
	Deck posts ⁽⁷⁾ , deck joists and beams ⁽⁷⁾ , external stairs ⁽⁷⁾	4	15	✓	2
	Timber retaining walls up to 1m high within gardens ⁽¹¹⁾	4	15	✓	2
	Timber retaining walls over 1m high within gardens ⁽¹¹⁾ , timber retaining walls up to 600mm high in a boundary situation ⁽¹¹⁾	4	30	✓	1
	Timber retaining walls over 600mm high in a boundary situation ⁽¹¹⁾	4	60	✓ ⁽⁸⁾	1 ⁽⁹⁾

Notes

- Preservative treatment of timber should be in accordance with penetration and retention values listed in Table 3 of BS 8417:2024. It is important to note that not all preservatives are appropriate for all Use Classes and that some timber species are not sufficiently permeable to achieve the penetration levels required, at least without additional processing such as mechanical incising.
- Where natural durability is used in lieu of preservative treatment, timber must be specified and selected as being heartwood only. Durability Classes for the heartwood of commonly used timbers are available in BS EN 350 and summarised in Table 2.
- Any hardwood can be used (subject to adequate structural performance). Recommendations based on evidence that the house longhorn beetle (*H.bajulus*) can attack the heartwood of some softwoods of lower natural durability. Geographic areas where treatment is required are defined in Approved Document A.
- Pitched roofs with a high condensation risk are considered to be roofs over swimming pools, pitched roofs with a fully supported weatherproofing membrane (eg single ply membrane, bituminous membranes, Glass Reinforced Plastic (GRP), etc) or continuous metal coverings, and any other roof system not designed in accordance with BS 5250.
- Sole plates should be positioned above Damp Proof Course (DPC). Preservatives used should be resistant to leaching.
- The base of support posts should be at least 150mm above adjacent ground level, supported on a free draining post base. Where posts are supported on low-level walls, piers or saddle stones, the top of the wall, pier or saddle stone should either have the same footprint as the post or be sloped away from the post, and the base of the post should be supported on a free draining post base at least 150mm above the adjacent ground level; alternatively, where the top of the wall or pier is flat and extends beyond the footprint of the posts, the base of the post should be at least 150mm above the top of the wall, supported on a free draining post base. See Figure 1.
- For decking and external stairs that are more than 600mm and less than 2.4m in height, deck boards, balustrades and external stairs should have a Desired Service Life of 30 years, and deck joists and posts should have a Desired Service Life of 60 years. Reference should be made to Chapter 7.1 Flat roofs and balconies, Chapter 10.2 Drives, paths and landscaping and the Timber Decking and Cladding Association Code of Practice: Raised timber deck structures on new homes. For balconies greater than 2.4m in height, timber is not permitted for gallows brackets, posts, columns, stairs, guardrails or their support, and cantilevered or infill joists (see Clause 7.1.6 for further guidance).
- No generic treatment specifications for a 60-year Desired Service Life in Use Class 4 are provided in either BS 8417 or the WPA Code of Practice for preservative treatments tested to BS EN 599-1, and so specialist advice must be sought from the preservative treatment supplier and/or manufacturer. Due to the potential difficulties in achieving the very high levels of preservative treatment penetration and retention likely required, NHBC requires satisfactory assessment by an appropriate independent technical approvals authority accepted by NHBC for timber components or systems in this scenario.
- Selected woods of natural Durability Class 1 may be able to achieve a Desired Service Life of 60 years (see BS 8417 for further details).
- For modified timber products (such as thermal or chemical modification), guidance on the Durability Class and use of the product should be obtained from the manufacturer.
- Timber retaining structures should not be used to provide support to homes, garages, roads, drives, car parking areas or drainage systems. Further guidance can be found in Chapter 10.2 Drives, paths and landscaping and the Timber Decking and Cladding Association.
- An open porch or canopy structure should not form part of the structure of the home, with no timber elements built into the external wall, and be open or without inserts to form an enclosure. The roof over such a porch or canopy structure should not link with the roof over the home.
- Load-bearing parts of the structure that support the weight of higher walls, floors, or roofs, and are essential to the structural stability or strength of the home.

Figure 1: Support post base example details

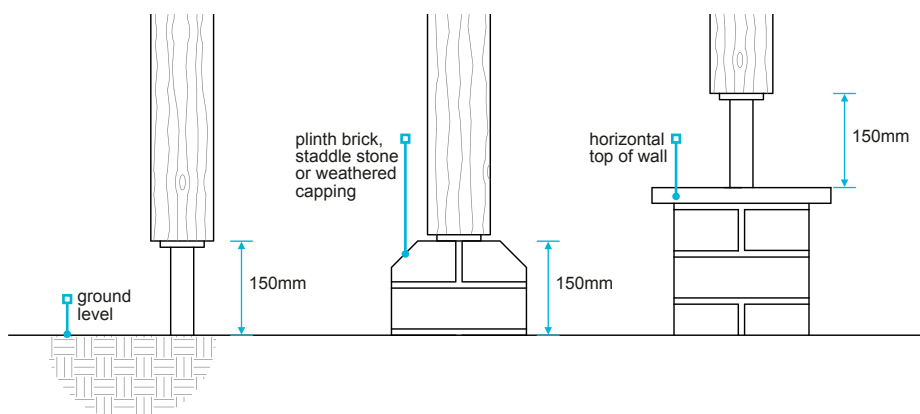


Table 2: Natural durability of building timbers (heartwood only)

Type	Durability Class ⁽¹⁾				
	1 Very durable	2 Durable	3 Moderately durable	4 Slightly durable	5 Not durable
Hardwoods	<ul style="list-style-type: none"> Jarrah Greenheart Okan Angelim, red Cumaru Ipé Padauk (African) Opepe 	<ul style="list-style-type: none"> Oak (European) Meranti (dark red, light red) Oak (American white) Jatoba Ekki Wengé Mahogany (American) Chestnut (sweet) Louro (red) Karri Balau (yellow) 	<ul style="list-style-type: none"> Oak (American red) Walnut (African) Balau (red) 	<ul style="list-style-type: none"> Meranti (yellow) Elm 	<ul style="list-style-type: none"> Chestnut (European horse) Sycamore Alder Birch (yellow, paper, European) Beech (European, silver) Ash (European) Poplar Meranti (white)
	<ul style="list-style-type: none"> Kapur Iroko 		<ul style="list-style-type: none"> Walnut (American, European) Oak (Turkey) Keruing Sapele 		
	<ul style="list-style-type: none"> Teak 				
Softwoods	<ul style="list-style-type: none"> Cedar (Eastern white) 	<ul style="list-style-type: none"> Cedar (yellow) 		<ul style="list-style-type: none"> Pine (Parana, radiata) Spruce (sitka) 	
		<ul style="list-style-type: none"> Cedar (Eastern red, Western red) 	<ul style="list-style-type: none"> Pine (Caribbean pitch, American pitch) Fir (Douglas) Cedar (UK Western red) Larch (European, Japanese, hybrid, Siberian) Pine (lodgepole, maritime, Scots) European Redwood 	<ul style="list-style-type: none"> Spruce (Norway) Pine (Austrian, Corsican, yellow) European Whitewood Hemlock (Western) 	

Note

1. Where a timber species has a range of Durability Classes, and for end uses where durability is important, the lowest Durability Class listed for a wood species should be assumed unless specific source-related information is available.

3.3.3 Sitework

Sitework shall follow established good practice and workmanship.

Checks should ensure that, when timber is delivered to site, timber and joinery products have received the specified treatment. This should be stated on the delivery note and invoice, or a treatment certificate. When buying from stock, always check which Use Class the wood has been treated to.

3.3.4 Protection and storage

Timber and joinery shall be stored and protected to ensure it is in a suitable condition for use.

It is important when timber and joinery products are stored that they are:

- protected from damage immediately upon delivery
- protected from the weather
- stored off the ground
- stored to limit the risk of distortion
- stored to allow air to circulate.

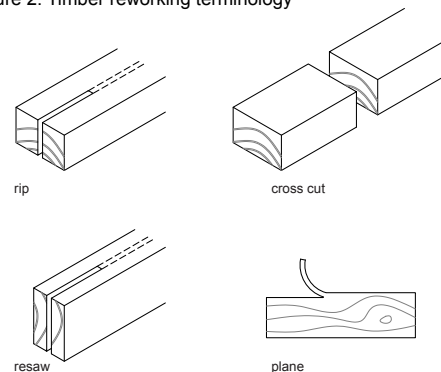
3.3.5 Treatment of cut surfaces

Timber which has been preservative treated and cut shall be re-treated on the cut surfaces.

Timber should not be resawn, ripped or planed after treatment, see Figure 2. Reworking should be limited to cross cutting, and cut ends should be re-treated with a suitable brush-applied preservative in accordance with the recommendations of the industrial wood preservative manufacturer. To enable confirmation that re-treatment has occurred, a colour tinted preservative should be used; only in situations where colour tinting will affect the appearance of the timber fixed to the home will clear preservative be acceptable.

For further guidance on reworking of treated timber, consult the industrial wood preservative treatment manufacturer and the Wood Protection Association.

Figure 2: Timber reworking terminology



3.3.6 Compatibility with metal

Measures shall be taken to prevent adverse effects from incompatibility between metal components and treated timber.

Copper-containing treatments can cause corrosion between mild steel and aluminium. Where moisture is expected, the following fittings should be used when in contact with timber treated with copper-containing preservatives:

- occasional dampness — galvanized fittings
- likely wetting — austenitic stainless steel fittings.

Preservative treated timber should be re-dried to a moisture content of 22% or less before being in contact with metal fittings.

3.3.7 Further information

- *BS 8417 Preservation of wood. Code of practice*
- *BS EN 599 — Part 1 Durability of wood and wood-based products. Efficacy of preventive wood preservatives as determined by biological tests — Specification according to Use Class*
- *BS EN 350 Durability of wood and wood-based products. Testing and classification of the durability to biological agents of wood-based materials*
- *BS EN 335 Durability of wood and wood-based products. Use Classes: definitions, application to solid wood and wood-based products*
- *The Wood Protection Association Code of Practice: Industrial Wood Preservation (2nd Edition: June 2021)*
- *The Wood Protection Association, Office 5, The Walled Garden, The Nostell Estate, Wakefield West Yorkshire WF4 1AB, Tel: 01977 558274, Email: info@wood-protection.org*

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