

The Protection and Care of Wood

Wood is an excellent material to provide cladding for buildings. Apart from being easy to install and aesthetically pleasing, wood contains sequestered atmospheric carbon captured during photosynthesis and acts as a carbon store. Carbon capture and storage for free!

However, wood when used in exterior applications often requires some sort of protection, but the question is what protection is needed and where? Wood protection is a broad term which includes wood preservation against fungi and insects, protection against fire, protection against the effects of weathering in exterior situations, as well as surface protection against (for example) abrasion for floors, decking, work surfaces, etc.

Wood preservatives usually rely on a biocidal action in order to enhance the durability of wood against biological degradation. The decision whether to apply a preservative or not depends upon the species and type of timber, the service conditions under which the timber element will be used and the desired lifetime of the product. Timber species are classified according to Durability Classes, as defined in BS EN 350-1. The environment in which timber is to be used is defined in terms of Use Classes, which are defined in BS EN 335-1. The main criteria by which use classes are defined are the exposure to moisture, with the length of time that the moisture content of the wood is above 20% being the key defining property. When timber has a moisture content above 20% it becomes susceptible to fungal decay.

Timber used in cladding applications is considered to be in Use Class 3, which is divided into Use Class 3.1 (exterior, above ground, protected) and Use Class 3.2 (exterior, above ground, unprotected). In Use Class 3.2, the moisture content of the wood is frequently greater than 20% and for some wood species it might be recommended to use a wood preservative.

Guidance for the appropriate choice of timber for different applications is given in BS EN 460, where the selection of timber for different Use Classes is matched against the Durability Classes. For example oak, which is in Durability

Class 2, can be used in outdoor cladding applications (Use Classes 3.1 and 3.2) without the use of a preservative. However, species such as Scots pine and Larch may require preservative treatment, especially in Use Class 3.2. The need for a preservative treatment applies especially if sapwood is present in the wood elements.

The key factor in ensuring a durable wood product in cladding and decking applications is to ensure that there is a good air flow to limit the risk of the wood moisture content rising above 20%. It is also highly advisable to apply a surface protector in order to prevent water from entering the wood material. Surface protection agents are available as solvent or water borne systems and can be clear or pigmented. They form a water-repellant film by polymerisation or coalescence and form a physical bond with the wood surface.

Unfortunately over time, coatings will fail and therefore require maintenance. Opaque coatings generally perform better than clear coatings because the underlying wood material is not exposed to damaging UV solar radiation. Many specifiers choose clear coatings because they want the beauty of the underlying wood to show through. The achilles heel with clear coatings has always been the lignin in the wood which degrades on exposure to UV light, resulting in de-bonding of the wood surface. The clear coating initially fails due to lack of adhesion in the wood surface layers, allowing water to penetrate the wood. Once this happens, the surface layers of the wood are subject to rapid dimensional changes which set up stresses in the coating, especially at the early-wood-latewood boundaries. Most wood coatings are made from organic (carbon-based) molecules which are themselves susceptible to UV degradation, although this can be slowed down by the use of inhibitors.



A radically different approach is offered by the Sioo:x Wood Protection system, which has been available in Sweden for over a decade, but which has only recently been introduced to the UK market. Primarily intended for cladding and decking applications, Sioo:x allows the natural beauty of the wood to show through. Sioo:x comes in two parts – a wood protector and a surface protector. The wood protector is a water-soluble alkaline silicate that penetrates the wood substance and gradually cures by reaction with atmospheric carbon dioxide to form insoluble silica particles inside the wood. The surface protector is a water-based silane emulsion that polymerises to form a flexible water-repellent silica network inside the surface layers of the wood. Sioo:x is not a coating, but rather an envelope protection system. Polymerisation of the silane inside the surface layers of the wood confers two advantages. First of all, the polymer network is inside the wood, not on the surface and it is therefore not possible for the surface protector to fail by loss of adhesion to the wood surface. Secondly the silica network acts to glue the wood cells together so that even when the lignin has degraded the integrity of the surface wood layer is not compromised. The silica network also makes the surface harder and improves abrasion resistance for decking applications. The chemistry of the silica network is also completely stable to exposure by solar UV radiation.

When Sioo:x is first applied, the wood takes on a darker honey-coloured appearance, but this soon begins to fade as the Sioo:x chemistry begins to work. As the curing process takes place the wood takes on a silvery grey appearance reminiscent of the driftwood appearance of exposed and unprotected wood. This leads to a very even silver-grey surface on exposed and unexposed surfaces and is one of the unique selling points of Sioo:x. The appearance of wood cladding is often marred by the differences between wood that is protected by overhanging eaves or not south-facing and wood that is exposed to direct sunlight. Sioo:x solves this problem by the exploitation of the unique chemistry of silicates and silanes. Sioo:x combines the inertness of stone with the beauty of wood and is often referred to a wood petrification. One other advantage of Sioo:x treated wood is that it is non-toxic and there are no environmental considerations when the wood is finally disposed of at the end of service life.

For further details and information on the Sioo Wood Protection System please refer to the UK website (www.sioo.co.uk).

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Working with nature

Sioo:x are leaders in wood protection using silicate technology.
We provide a highly effective proven system to protect wood of all types.
It gives long life and a beautiful natural surface with even colouration and is friendly to people and the environment.
An example is the summerhouse by architect Leo Quarsebo, Sweden.

Read more on www.sioo.co.uk



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