

GUIDANCE NOTE

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Understanding Modified Wood

Introduction

Wood modification technologies provide designers, builders and users of wood and wood-based products with another option where enhanced performance, including durability and dimensional stability, is required. This Guidance Note provides a brief introduction to this group of innovative products.

Modified wood products are distinct from either naturally durable or preservative-treated wood. Performance testing may not be carried out in the same way (see Guidance Note [WPA MW 2](#)) and may be specific to a particular modified wood system. For guidance on the correct specification of a particular type of modified wood, please refer to the manufacturer for advice.

Wood modification

Wood modification involves the action of a chemical, biological or physical agent upon the material, resulting in a desired property enhancement effective for the service life of the modified wood. If the modification is intended for or confers improved resistance to biological attack, then the mode of action should as far as can be determined, be non-biocidal. If in doubt, please check with manufacturer.

Current commercially available modified wood technologies can be grouped into three main types:

TYPE	MODIFICATION PROCESS	COMMERCIAL EXAMPLES
CHEMICAL modification	Processes that chemically modify the wood polymers through chemical reaction and change the wood structure at a molecular level.	Accoya® Wood Medite Tricoya® Extreme MDF Kebony®
PHYSICAL modification	Processes that do not chemically change the wood but alter the properties through a physical process, such as filling cell walls or lumen with bulking agents, typically resins.	No current significant commercial applications
THERMAL modification	Processes that involve the use of heat, typically above 160°C, often combined with pressure, moisture and the absence of oxygen. The wood is altered at a molecular level.	Abodo® Thermowood® Brimstone®

Characteristics of modified wood products

For many end-uses of wood, particularly where there is a risk of wood becoming wet, durability (resistance to biological attack) is seen as the key characteristic for determining its suitability for use. Most wood modification processes improve wood durability to varying degrees. However, improving durability is commonly not the sole effect of wood modification.

Although a range of wood properties may be affected by the modification process, the suitability of modified wood for a given end use is based on three main criteria: **durability** to wood-destroying organisms (fungi and insects), **strength** and **dimensional stability** in changing humidity.

Durability: Service environments have been categorised into a series of use classes in BS EN 335. Five classes are defined which describe the different service situations on the basis of the biological hazard likely at the in-service moisture conditions which may prevail.

Table shows use class, service situations and suitable types of modified wood*

USE CLASS	SERVICE SITUATION	TYPICAL APPLICATION	MODIFICATION TYPE		
			CHEMICAL	PHYSICAL	THERMAL
1	Above ground, covered. Permanently dry	Internal, with no risk of wetting.	Not required	Not required	Not required
2	Above ground, covered (e.g. by a roof). Occasional risk of wetting	Internal, with risk of wetting.	✓	✓	✓
3	Coated, above ground. Exposed to frequent wetting.	External, above damp-proof course (dpc).	✓	✓	✓
	Uncoated, above ground, not protected. Exposed to frequent wetting.	External, above damp-proof course (dpc) uncoated.	✓	?*	?*
4	In contact with ground or fresh water. Permanently exposed to wetting.	Timbers in permanent contact with the ground or fresh water.	✓	X	X
5	Permanently exposed to wetting by salt water.	All components in permanent contact with sea water.	✓	X	X

*Generic assessment. Please check with manufacturers for product specific performance claims.

Dimensional Stability: Dimensional change under the influence of fluctuating humidity.

Strength: A measure of the ability of wood to resist outside forces, such as compression, tension and shear. Different aspects of strength may be more relevant than others for particular end uses. **Please check with manufacturers for product specific claims regarding effects on strength.**

NOTE: The performance of modified wood products in fire can normally be enhanced using a secondary flame retardant treatment. See Guidance Note [WPA MW 2](#) for more details.

Coatings for modified wood

Coatings may be applied to modified woods in a similar way as other wood, using both factory and manual techniques. The long-term performance of a coating and its maintenance requirements are important factors. Experience has shown that the more dimensionally stable a material is, the more likely that the frequency and cost of maintenance is reduced. Where modified wood is used, the full factory application of a coating may come with an extended warranty (to date, this is available with **Accoya®** and **Tricoya®**). Indeed, the enhanced stability of modified wood is proving increasingly popular for joinery and external trim.

Quality Assurance

Because the properties of modified wood are very dependent on the wood modification process used, to be certain of consistent performance, products must be produced using a Factory Production Control system (FPC), with third party accreditation specific to each individual product and process. Where a product is covered by a harmonised (EU) or designated (GB) standard – CE, UKCA or UKNI marking may additionally be required.

Such accreditation must examine all the critical process parameters that confer the claimed properties of the named individual modified wood product, along an assessment of quality control checks and independent analysis of samples.

Recommended further reading: TRADA Wood Information Sheet 2/3-63 'Modified Wood Products'

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