

## Abstract

# Effect of a New Mono-Component Polyurethane Coating on Untreated and Heat-Treated Ayous Wood (*Triplochiton scleroxylon* K. Shum)<sup>†</sup>

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**Abstract:** This contribution synthesises the results from the study of the behaviour of Ayous (*Triplochiton scleroxylon* K. Shum) wood, untreated and industrially heat-treated at 215 °C, with the subsequent application of a mono-component polyurethane coating. The coating was applied by brush and spray, according to the indications supplied in the technical data sheet, to verify the most effective modality. The samples were artificially aged under simulated solar irradiation in a Solar Box chamber to verify the behaviour over time of the protected and of the unprotected wood, untreated and heat-treated. To investigate the behaviour of the specimens, micro-hardness, wettability, wearing, colour and roughness were measured and compared before and after artificial ageing in the Solar Box chamber. The obtained data highlighted that the coating improved the surface characteristics of Ayous wood by increasing the hydrophobicity, the homogeneity of the surfaces, the micro-hardness, and the resistance to wearing. Colour exhibits little variations in natural wood, higher in the heat-treated wood. The ageing process under simulated solar radiation caused some relevant changes in the surface properties, generally worsening the wood surface characteristics, especially in the uncoated samples. Specifically, hydrophobicity decreases significantly in the heat-treated uncoated samples, whereas in the same samples but coated the hydrophobicity is maintained thanks to the presence of the polyurethane layer. Micro-hardness undergoes little decrease in all samples, because of ageing. The greatest effect is observed in the control samples, i.e., untreated thermally and uncoated. The effect of coating is particularly relevant on the wearing resistance. In fact, samples with coatings are much more resistant to wearing than uncoated ones and they also suffer fewer colour changes. This result demonstrates the good performance of the polyurethane coating and its effectiveness in the protection of wood exposed to outdoor conditions.

**Keywords:** Ayous wood; polyurethane coating; surface properties; mechanical tests; colour; artificial ageing



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