https://doi.org/10.17306/mk.978-83-67112-51-2.9

Recent developments and trends in furniture coatings

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Keywords

coatings
solvent-based
water-based coatings
uv-cured coatings
powder coatings
furniture

Abstract

The overall growth of the furniture coatings market can be attributed to the rising worldwide population and increasing customer demand for furniture. Wood coatings are materials applied to the surface of a furniture to protect it from both natural and man-made impacts. Solvent-borne coatings continue to be used in two-thirds of all wood coatings today, followed by water-borne, UV-curable, and powder coatings. There is a significant transition toward sustainable solutions as a result of increased awareness of eco-friendly products, environmentally friendly furniture, increased quality features, lower volatile organic compound (VOC) emissions coatings, and the use of renewable green materials. Recent advancements in furniture coating technology have focused on the development of bio-based and high-performance coatings that will allow the formulation of sustainable and low-VOC coatings. This review provides a comprehensive overview of the most recent advancements and trends in furniture coatings.

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Introduction

Wood is a versatile raw material used in indoor and outdoor applications for decoration and construction. However, because wood is an organic material, it cannot naturally withstand all of the external effects to which it is subjected, especially when exposed for an extended period of time. Because of their sensitivity to light weathering and aerobic oxidation, color change in lignocellulosic composites made of wood is unavoidable (Emery and Schroeder, 1974; George et al., 2005). When exposed to UV light, the surface color change is primarily caused by chemical and physical changes in both wood and polymer (Matuana et al., 2011).

Scratches are harmful to a product's aesthetics and functionality, as well as its value. These negative properties reduce the lifetime and value of wood materials. As a result, the long-term durability and natural appearance of the materials utilized should be preserved in both indoor and outdoor conditions.

Various methods that improve the properties of the materials are now available for extending the lifetime and increasing the value of wooden materials. Coating of wood is one such method. Wood coating helps the desirable properties of wood surfaces, such as enhancing the appearance of the wooden surface and increasing durability and resistance (Bulian and Graystone, 2009). The primary function of wood coating is to maintain the wood surface in good condition. The anti-scratch coating disables issues. It also provides a more scratch-resistant surface than the original. The coating of wood appearance is mainly for surface preservation and therefore increases its utilization properties (Ramage et al., 2017). Wood coatings are utilized in hospital furniture, research laboratories, dining halls, and hotels.

The rising global population and increased customer demand for furniture can be related to the overall growth of the furniture coatings industry.

Table 1 summerized the market outlook for wood coatings between 2022 to 2032.

Table 1. Wood coatings market outlook (Fact. MR, 2022)

Expected market value (2022)	US$ 9.7 Billion
Projected forecast value (2032)	US$ 17.7 Billion
Global growth rate (2022–2032)	6.2% CAGR

This paper aims to provide a comprehensive overview of the most recent advancements and trends in furniture coatings.

Furniture wood coatings

The global furniture wood coatings market is divided into four main types: solvent-borne, water-borne, UV-cured, and powder. Solvent-borne coatings continue to be used in two-thirds of all wood coatings today, followed by water-borne, UV-curable, and powder coatings.

Solvent-borne coatings are composed of petroleum-based solvents such as ketones, toluene, xylene, and propanol. Solvents dissolve the adhesives and additives used in the coating formulation and evaporate when they react with oxygen after the coating has been applied. Solvent-borne coatings are commonly used due to the general improvement in overall finishing, flexible application, quick drying, high gloss for image distinction, low cost, and ease of application on any wood substrate. However, they have disadvantages like high flammability and VOC content.

In water-borne wood coatings, water is utilized as a solvent to disperse additives and adhesives. These coatings are made up of water and other solvents such as glycol ethers. Water-borne coatings are inexpensive and have good adhesion despite the use of additives, thinners, and hardeners. They are popular in Europe and the Americas due to their low VOC emissions.

A UV coating is a type of wood finish in which the surface is cured using ultraviolet radiation. UV coatings are non-toxic to the environment since they do not include any solvents. Unlike varnishes, they do not emit volatile organic compounds, or VOCs, when cured. When compared to other methods, the UV coating process uses much less energy.

Powder coatings have attracted attention because of their efficiency, low cost, higher performance, and environmentally friendly nature. The main difference between standard liquid coatings and dry powder coatings is that powder coatings do not require a solvent, making them more environmentally friendly. Powder wood coatings not only improve the process but also extend the lifetime of the finished products.

Conclusions

Wood coating formulations have had to deal with a few important industry developments over the last few decades, such as the transition from solvent-based to water-based, UV-Cure or powder formulations. Long-term and short-term expectations for interior wood coatings include more durable, easy-to-use/apply, lower-VOC, environmentally friendly, and more sustainable coatings. Furthermore, water-borne, UV-cured wood coatings and powder coatings will continue to be popular.

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