TECH OFFER

Transparent Fire-Retardant Coating For Timber

KEY INFORMATION

TECHNOLOGY CATEGORY: Chemicals - Coatings & Paints

TECHNOLOGY READINESS LEVEL (TRL): TRL4

COUNTRY: SINGAPORE

ID NUMBER: TO174215

OVERVIEW

Timber usage in building and construction industry has seen rising demand in recent years due to the emphasis on aesthetics, carbon footprint, sustainability, etc. It is used for applications such as decking, cladding, furniture and increasingly, loadbearing and non-loadbearing elements in urban buildings. However, timber is flammable (and susceptible to combustion), for many of the building applications, fire protection is required. Currently, in the market, to provide the necessary fire protection, generally, timber elements are clad with fire-rated boards (gypsum, magnesia, cementitious, etc.) or coated with intumescent fire-retardant coatings. Therefore, the concept of ‘fully exposed mass-engineered timber (MET)-based building’ or the characteristic features of ‘aesthetics / wooden-feel’ are lost. This is where the proposed technology of transparent fire-retardant coatings will be disruptive. This organisation is looking to collaborate with companies/investors to further develop the transparent fire-retardant coating into a final product of specific interest.

TECHNOLOGY FEATURES & SPECIFICATIONS

This transparent fire-retardant coating for timber is able to largely reduce the heat released and prevent flame spread. Laboratory-based preliminary testing and analysis showed that the coating has the potential to meet the fire safety requirements (Class B in EN 13501-1 and Class 0 in BS 476: Parts 6 & 7). This is achieved by a novel combination of ingredients that are able to accelerate charring as well as cause rapid expansion of the charred layer to more than 40 times of the coating thickness thereby protecting the underlying timber from pyrolysis. Furthermore, crucially, transparency of the coating ensures timber’s beauty is not compromised.

POTENTIAL APPLICATIONS

Wood is one of the most versatile, sustainable, aesthetically pleasing, and environmentally benign materials. It can be classified into hard and soft wood, which can have different percentages of cellulose, hemicellulose, and lignin. Different types of wood products including solid wood-based panels (particleboard, hardboard, fiberboard, plywood, CLT), structural timbers, glued laminated timbers, cladding and wood floorings are widely used for structural purposes in building construction, flooring and furnishing materials that found in homes, schools, and offices around the world. The basic deficiencies of wood products are flammability, poor dimensional stability, and low resistance to micro-biological decay that must be addressed when used as a construction material. Based on the feedback obtained from different companies operating in various customer segments, the applications like cladding, fire-rated doors, reconstruction of heritage sites, and more importantly MET were identified as high potential for entry into market.
UNIQUE VALUE PROPOSITION

Currently used technologies like the usage of boards results in a significant loss in construction productivity due to the cutting and installation of boards (labour intensive). By using the transparent coating technology, these drawbacks could be easily addressed. Timber in heritage sites are often coated with typical intumescent coatings that are not transparent resulting in complete loss of aesthetics. The proposed technology would again provide a means to overcome this drawback.