

Toby Technical Bulletin 21

Yellowing of Wall Paints

Introduction

There have been cases reported of yellowing of water-based wall paints and/or plaster or similar products after the application of solvent-based polyurethane timber floor finishes.

Those incidences are extremely rare and have mainly been observed in the southern states during colder weather and in poorly ventilated rooms. The problem occurred when the paint was applied over not fully cured plaster, particularly between joints or in corners. The application of an undercoat or primer seems to eliminate the problem.

Technical Aspects

The exact mechanism appears to be complex. The most likely explanation is a reaction between the neutralising agent in the wall paint and the isocyanates from the polyurethane floor coating, phenolic compounds in certain plasters may also contribute to the phenomenon.

Neutralising agents in water-based wall paints are amines. The most commonly used amine for this purpose is ammonia, which is unlikely to cause problems due to its fast evaporating nature and its chemical structure. Other amines used in wall paints, like aminopropanol, have a much slower evaporation rate. Those amines are actually more expensive than ammonia and are used in paints to improve manufacturing and application properties. However, slow evaporating amines stay in the paint film much longer and can migrate into the plaster. Poor ventilation and cold weather significantly retards their evaporation and the amine may still be available several weeks after application of the paint under such conditions.

All solvent-based polyurethane floor finishes contain isocyanates. Isocyanates cure via reaction with moisture from the atmosphere (moisture curing PUR) or with a polyol (2-pack PUR) to a polyurethane. They can also react with amines or phenolic compounds if available, the reaction products are yellowish.

Avoiding The Problem

A freshly painted room should be ventilated in order to let the vapour (and the smell) from the paint disappear and to speed up the curing process. The longer the curing time for the paint and the better the ventilation, the less likely the chance of problems with yellowing. Drying of any coating during cold weather is very slow and no coating will dry at very low temperatures without good ventilation. The paint has to be fully cured prior to the application of a solvent based polyurethane floor coating.

The plaster/render should be dry prior to the application of the paint and the application of a suitable undercoat or primer is recommended.

The floorsander has to be cautious when he has to coat a timber floor in an area where the walls, ceiling or other part of the house have been freshly painted, rendered or plastered. Other warning signs are poor ventilation and low temperatures. Confirm with the homeowner or person in charge of the building that no responsibility is taken or get approval to properly ventilate the area for at least 24 hours before commencing the work.

For further technical advice call our Technical Hotline on 1800 073 530.

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