Remmers Information Sheet

Resin exudation and tannin staining

Timber is a natural material containing a number of different chemicals which formerly played an important part in the functions of the living tree. Two of these chemicals are a possible source of surface staining in light coloured paint finishes.

There are a group of chemicals which become mobile under the effect of heat. These are often referred to as exudates and the main ***exudate*** within softwoods is referred to as **resin,** hence the term resin exudation. In the most commonly used softwood in the UK, Scots Pine (European Redwood) the resin will be mainly present in knots but there will also be deposits of resin in certain bands of the sapwood. The main exudate in hardwood is referred to as **gum**. Resin or gum exudation is very difficult to hold back especially on colours that promote solar heat gain in the coating film. It is well known that dark colours will do this but even mid-range colours such as pastel greens and beige will suffer from solar heat gain on sunny days. The only coatings that can hold back the movement of resins are those that form a closed structure to prevent the large resin molecules from permeating through the coating. If these are very effective at holding back the resin movement they can be problematic because the pressure of the resin overcomes their adhesion to the substrate and removes the coating. This can happen with traditional knotting compounds.

The most effective coating solution is to use two component polyurethane systems that hold back resin for long periods of time and actually form a chemical bond with the timber surface, giving excellent adhesion to the substrate, that even resin exudation doesn't usually overcome. Two component polyurethanes do however require special equipment or very labour intensive cleaning cycles with spray equipment. No matter what precautions are taken there are no guarantees against resin exudation occurring. Resin can pass through modern water-borne microporous coatings without damaging the coating film but the resin will be visible.

The other group of chemicals that are a major source of staining in light coloured paint films are known as extractives or tannins. These are waste chemicals produced during the life of the tree that are often quite rich in colour. Many of them are water soluble and can be mobilised when water-borne coatings are applied to the timber. Good examples of this are hardwoods such as Idigbo and softwoods such as Western red cedar. One of the worst timbers for tannin staining is European Redwood (Pinus Sylvestris). If this timber contains knots, the margin around the knot is very rich in tannin and it is extremely difficult to prevent staining in these areas. We strongly recommend that where possible knot-free timber is used. For hardwoods rich in tannin such as Idigbo we have specialist tannin-inhibiting coatings such as Induline ZW-425. These are very effective at preventing tannin staining on the vast majority of hardwood species, but testing is required to confirm their suitability.

Solutions

- **Avoid unsuitable timbers to try and prevent tannin and resin staining. Knot-free softwood can reduce the incidence of problems. Try not to choose tannin rich timbers for light coloured opaque finishes where possible.**

- **Site conditions and joinery design are critical. Avoid excessive moisture caused by incorrect site storage or poor joinery design features with water traps as this will promote tannin staining.**

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- **Ensure primers and mid coats are thoroughly dry before applying subsequent top coats. Moisture activates tannins so properly dried and cured coatings restrict tannin bleed more effectively.**

- **Use specialist tannin-inhibiting coatings such as Induline ZW-425. Contact Remmers for advice on the correct coatings.**

For further advice contact the Remmers Woodcoating Technical Team.

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