

Varnish failures cause and remedy

Varnish - the more the preparation the better the finish



Floor finishes peel because the floor was contaminated or improperly prepared when the finish was applied.

Unfortunately, in most cases, it is not possible to predict rejection on a floor before the coating application. Signs of rejection normally occur after application of the first or second coat during the initial drying process and the evaporation of the carrier.

The removal of contaminants from the floor before the coating application is critically important. Even when a floor has been cleaned and is free of rejection, a high concentration of certain contaminants remaining on the floor may weaken the bond between the coats and later cause delamination.

A contaminated floor won't hold finish. Dirt or chemicals on top of a floor or embedded in its finish can cause subsequent coats of finish to flake or peel off.

Excessive sanding with high-grit paper can burnish wood and create a surface too smooth for the finish to adhere. Inadequate abrading or cleaning between finish coats, applying a top coat over a floor that is not dry, or working with incompatible finishes all can cause peeling. However, the most common cause of peeling is stain residue that has not been cleaned from the floor prior to applying finish. To prevent a build-up of stain residue, remove excess stain quickly after it was applied and let the floor dry thoroughly before applying the finish. Do not apply multiple coats of stain or let stain sit in an attempt to darken wood.

The best way to fix a peeling floor is to sand it down to bare wood and restart the finishing process. Simply abrading the floor and applying a new top coat might not fix the problem. Without resanding, waxes, oils, and furniture polishes used to clean wood floors seep into the pores of the finish and can prevent the new finish from bonding successfully.

Throw away contaminated equipment like sandpaper, application pads, or rollers. This prevents further contaminants from being transferred. Sanding can spread contamination across the floor.



Varnish adhesion loss can occur on either interior or exterior surfaces.

A varnish coating will have great difficulty adhering to the substrate - new or previously painted, interior or exterior - if any surface contaminants such as dirt, dust, oil, grease, mould, mildew, algae, salt, or other loose or powdery substance is present on the surface. Even high-quality, high-performance products can fail to adhere adequately to a contaminated surface.

If the substrate itself is unstable, powdery or if any previous coatings have deteriorated to an extent that they have become unsound or showing signs of failure, then it is unlikely that the overall coating system will remain firmly adherent, simply by applying a new coating over the top.

Whilst every coating system does have a limited life, it is possible to maximise long term performance by implementing a periodic care and maintenance program.

The only circumstance, by which a coating can lose adhesion from a substrate without an external influence interfering with its adhesion, is if the varnish coating is incompatible with the substrate.

This incompatibility is not a failure of the varnish itself but rather a failure of awareness.

It is therefore imperative that the manufacturer instructions regarding product suitability over specific substrates be carefully observed and adhered to.

How it occurs

A coating failure can be expected when the adhesion or cohesion of a layer within the coating is overcome by one or more external forces.

Some forces e.g., moisture ingress, act more quickly than others.

Unsound or incoherent substrate e.g., weathered timber, weak or unsound masonry or plaster.

Lack of preparation of the substrate e.g., leaving contaminants or loose material on the surface, excessively high gloss, excessively smooth surface.

Lack of maintenance of existing coating e.g., deterioration allowed to proceed to the point where film integrity is lost and the substrate becomes exposed.

Lack of preparation of existing surfaces prior to varnishing e.g., leaving dirt, mould, salt or other contaminants on the surface, varnishing over excessively high gloss surfaces without sanding to remove gloss and provide a mechanical key for subsequent adhesion.



All or any of these undesirable conditions will compromise the varnish ability to withstand the external forces that it is subjected to on a day-to-day basis.

Bare or previously varnished surfaces need to be sound, clean, dry, chemically stable, and free of any exudation, efflorescence or biological growths such as mould, mildew or algae. Glossy surfaces should be dulled-off by lightly sanding to provide a good mechanical key for subsequent adhesion of the varnish.

Bleeding

Staining or discoloration of the varnish by contaminants. A soluble matter leeching out from a substrate causing discolouration of varnish.

Amongst substances likely to cause bleeding are bituminous residues, some dyestuff and lake pigments, metallic inks used on wallcoverings, tobacco tar, nicotine staining, tar deposits and resinous materials in timber. Stained areas resulting from burst pipes or overflows may also bleed.

Remove potential cause of bleeding, e.g., water stains, resins, metallic inks in wallcoverings or bitumen.

Bleeding may not become evident until sometime after varnishing has been completed .

If the varnish is applied over a porous paint - designer emulsion, matt emulsion, chalk paint - the varnish will pass through the porous paint and activate - wet out - the residual stain trapped beneath.

This will drag the stain through the paint film and discolour the varnish.



Blistering

Blistering of Varnish. This defect is, the swelling out of the varnish film in places after it is dry into bubbles or blisters. The cause of blistering is the action of heat, usually the sun, drawing out of the wood moisture or sap which has been sealed in by the varnish. Moisture in the under coats of paint, enamel, etc., and grease on a surface varnished are also causes of this trouble. Non-drying oil in the wood when varnished will cause blistering. The action of the sun or heat from another source will expand the liquid under the varnish. The expanding liquid tears the varnish loose to make room for the increasing volume of the liquid. The better the quality of the varnish the more elastic it is, and the more elastic the varnish, the more likely it is to blister when subjected to these unfavourable conditions.



Cissing Reticulating

This describes a defect in which freshly applied varnish recedes from the surface leaving small craters or bare areas. The usual cause is contamination of the surface, e.g., by grease, oil, wax polish or silicones. Also occurs if the substrate has been pre coated and that coating is not cured.

Sand and reapply.



Cracking - checking, crocodiling, crazing

All forms of the defect are indicative of stresses within the coating system which it is not sufficiently flexible to withstand.

This may be the result of ageing and consequent embrittlement of the system; of movement, (e.g., expansion or contraction), in the substrate or of the application of hard-drying coatings over softer ones. Slight surface cracking, checking or crazing can sometimes be remedied by rubbing down, filling if necessary and recoating. In severe cases and especially if the cracks extend through the whole thickness of the film, the surface must be stripped.



Curtaining - running, sagging

The usual causes are uneven application to broad, flat surfaces or over-application to mouldings and to rough or contoured surfaces.

Failure to join up wet edges before they have set may result in excessive film thickness and curtaining or sagging. To remedy the defect, the varnish must be allowed to harden thoroughly before flattening down and recoating.

Prevent curtaining by applying the coating evenly and avoid heavy coats. Plan the work accordingly so that the wet edge is kept open.



Discoloration

There are many possible causes of the discoloration of varnish films.

Some types of moulds or fungi can cause discoloration of varnish. When discoloration has occurred, there is usually no alternative to recoating, but if a recurrence of the defect is to be avoided, it is necessary to establish its cause and, if possible, to use materials resistant to the conditions. Mould indicates that water is leaching into the timber from cracks, bad joints or unsealed glass beads. See Polyvine preparation guidance.



Flaking and peeling

As with blistering, moisture beneath the varnish film is a frequent cause of flaking as is the application of varnish to powdery or friable surfaces and previous coatings. Dirt, oil, grease and polish residues on the surface impair adhesion and may result in flaking.

Excessive movement of the substrate, e.g., at joints in woodwork, may impose stresses on the film causing cracking, and ultimately flaking.

Small areas of flaking can often be dealt with by removing the loose material back to a firm edge, touching-in as necessary, then recoating. If the flaking is extensive or the overall adhesion of the system is doubtful, the surface should be stripped completely before repainting.



Flashing

The presence of glossy or dull patches on a varnished surface is known as flashing. Flashing can be caused by applying varnish over an unprepared surface which can cause uneven sinkage due to different absorption rates, the edges setting before the joints are overlapped. Remember that preparation is key. Apply varnish over a well-sealed surface, increase the time of application, use better quality brushes and reduce the room temperature.



Loss of Gloss

A gradual loss of gloss is to be expected as a finish ages. Early loss of gloss may be caused by applying varnish in unsuitable conditions, e.g., low temperature or high humidity, or to surfaces on which there is grease, oil, wax polish or other contaminants.

Failure to rectify the porosity of the surface may result in sinkage of the finish and loss of gloss.

Over thinning and slow drying is also a cause. If the coating dries satisfactorily and is not otherwise affected, application of a further coat will usually restore the gloss.

Bubbles

Air trapped in the varnish film, caused by shaking the container before application, brushing the varnish too hard during application, pressing hard on the roller or using a pile roller that generates air. The bubbles can be sanded flat when the varnish is dry and recoated.

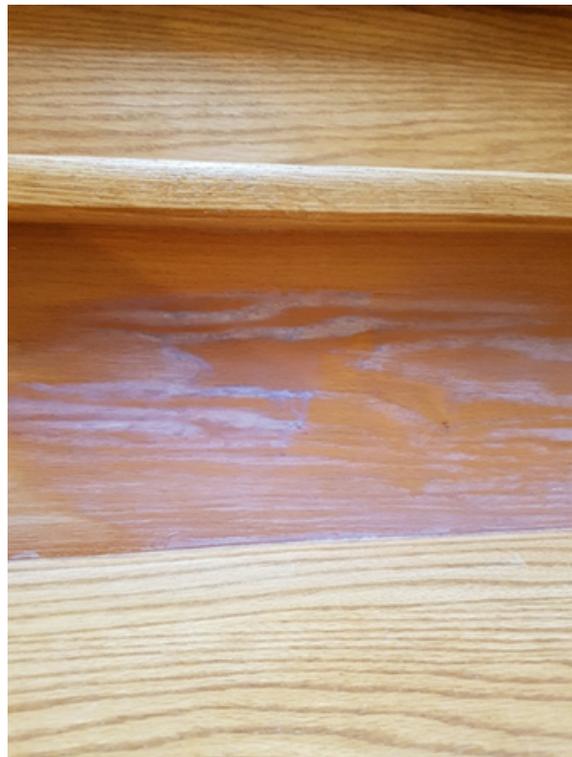


White Haze

Varnish applied in cold conditions and not curing

Contamination preventing the varnish from fully curing

Raise room temperature, if white haze remains, remove varnish.



by Peter Wells, Polyvine Technical Director.