

Toby Technical Bulletin 10

Application of Gloss Reduced Polyurethane Coatings

Background

The application of gloss reduced polyurethane (SEMI GLOSS or satin) floor coatings is more demanding compared with high gloss finishes.

Wrong application technique or inadequate environmental conditions can result in an unsatisfactory appearance of the surface.

The following phenomena are often seen:

- brush marks
- roller marks
- lap marks
- patchiness
- streakiness
- gloss variations

- milkiness

Physical Properties of SEMI GLOSS and Satin Polyurethane Clear Coats

Gloss reduction of polyurethane coatings is mainly achieved by adding flattening agents into the system. After application of the coating onto a floor, the solvent evaporation causes a reduction of the film thickness, and the film shrinks.

Once the film has dried, the flattening agents provide a micro roughness on the surface, which is evaluated by the human eyes as a gloss reduction of the coating.

Please bear in mind:

THE DEGREE OF SEMI GLOSSING EFFECT DEPENDS ON THE THICKNESS OF THE FILM

Wet film	Thick film	Thin film
Evaporation	= higher	= lower
of solvent	gloss	gloss

Diagram: Formation of flattening agent in satin/SEMI GLOSS polyurethanes



By considering the previously mentioned comments, it is understandable that gloss variations, streakiness, patchiness, lap marks, roller marks and brush marks are a result of an uneven coating.

The final gloss level of a coating system is influenced by:

- Material
Environmental Conditions
- Application Technique

Material

Some easy routine preparation before application of gloss reduced polyurethane's should be made common practice:

1. Shaking/Stirring of Material

All pigmented coatings (incl. SEMI GLOSS and satin polyurethane coatings) must be thoroughly shaken or stirred for at least 3 minutes before use, to make sure the flattening agent is evenly distributed. Although there is no hard sedimentation in the can, pigments have a tendency to migrate to the bottom while resins accumulate on top. Typically, an improper shaking of material will cause patchy and streaky finishes. Also, gloss level variations can occur with higher gloss areas at the beginning and lower gloss areas at the end of the job.

2. Straining

As a precaution, always strain material through a stocking. Pre-opened cans could have formed reacted articles around their lids that could contribute to application problems.

3. Use only Compatible Materials

Toby UNITHANE SEMI GLOSS and **SATIN Cork & Timber Finishes** are designed as a finish coat application over **Toby UNITHANE CLEAR GLOSS**. Use with any other manufacturer's product could result in detrimental effects on product's performance.

Best results are achieved by using one coat of **Toby UNITHANE SEMI GLOSS** and **SATIN Cork & Timber Finishes** on two coats of **Toby UNITHANE CLEAR GLOSS** or two coats of **Toby LUSTAPOL**. Alternatively, one coat of the gloss reduced **Toby Finish** can be applied over the appropriate **Toby Sealer** and one coat of **Toby UNITHANE GLOSS** or **Toby LUSTAPOL**.

4. Toby WET EDGE EXTENDER

Toby WET EDGE EXTENDER should be used if the temperature drastically reduces the working time of the finish. **Toby WET EDGE EXTENDER** must be thoroughly stirred into **Toby UNITHANE SEMI GLOSS** and **SATIN**, otherwise problems such as patchiness and streakiness will occur. Do not over-dose Toby **WET EDGE EXTENDER** and do not use it at cooler temperatures. An addition of 2-5% (20-50 ml/litre) Toby **WET EDGE EXTENDER** is recommended on warm days.

5. Never Use Different Batches for the Same Job

Although gloss levels of materials are production controlled and tested, all gloss-reduced systems naturally have slight gloss differences from batch to batch, therefore never use two different batches for the same finish.

6. Mixing SEMI GLOSS and Gloss

A satin finish describes a gloss level, which is higher than SEMI GLOSS but lower than gloss. Where Toby **UNITHANE SEMI GLOSS** and Toby **UNITHANE CLEAR GLOSS** are mixed together, the SEMI GLOSS should always be mixed into the gloss with good stirring. Proposed ratio is 60 parts of Toby **UNITHANE SEMI GLOSS** to 40 parts of Toby **UNITHANE CLEAR GLOSS**. The higher the ratio of **Toby UNITHANE CLEAR GLOSS**, the more 'forgivable' the finish will be.

Note: Never mix Toby products with products from other manufacturers.

Environmental Conditions

1. Temperature

Recommended temperature is between 12°C and 30°C. If a polyurethane coating is applied at lower temperatures, drying behaviour of the coating will be out of the recommended temperature range and surface defects may occur.

Because of the dew point, a fine layer of moisture can be on a floor at low temperatures and will chemically react with the polyurethane coating. Do not apply the finish if a significant drop in temperature is expected during the initial drying period. Milkiness, blotchiness and bubbling may result.

Temperature differences on some floors, due to sunlight coming through windows, can provide for some spots on the floor with a significantly higher temperature, and should be avoided. The solvent evaporation on warmer substrates is much quicker and can result in a different orientation of the flattening agent. In some cases, the finish has an even surface, but some glossy and some SEMI GLOSS areas.

As a precaution, cover the windows with newspaper.

2. Humidity

Toby **UNITHANE SEMI GLOSS** and **SATIN FINISHES** are moisture-cured coatings and their drying behaviour depends on the relative humidity of the surrounding air.

3. Air Flow

Uncontrolled airflow over freshly applied material can generate different problems. Apart from bubbling, the drying process of the material will be irregular and orientation of the flattening SEMI GLOSSing will be affected. Significant gloss variations are the result. To avoid problems caused by airflow, such as a higher gloss level close to doors and entrances, seal doors to prevent airflow from blowing over the surface.

Airflow, combined with high humidity is disastrous. Every precaution should be taken to avoid uncontrolled airflow. It will also help in keeping dust outside resulting in a more attractive finish.

Application Technique

It is important to have sound knowledge of the correct application technique and an understanding of what influences can have an impact on the final result.

The gloss level of pigmented systems depends on the application method. The same material applied with different methods of application can result in different gloss levels.

Problems with gloss variations, including lap marks and roller marks are highlighted on darker timbers and if the material is applied across the grain.

Tools

Best results have been achieved by using a 6 mm nap mohair roller. Edges can be brushed. Lambswool applicators are not recommended due to their inclination of film thickness variations, resulting in a higher probability of gloss variations.

Application

Wherever possible, all materials should be applied in the direction of the timber boards.
Direction of Application

Every roller action generates lap marks. If the roller is used as shown in the above diagram by following its heavier side, the under-weighted side of the roller can help to flatten the generated lap marks.

Always apply the materials in a single direction. Try to move lap inarks between and in the direction of the boards where they are less visible. It is also important to keep a wet edge during application.

Do not apply the gloss-reduced finish too thick. An application rate of 12-13 m²/litre is recommended.

Use of Toby FLO-ADD Anti-Rejection Additive

Do not use anti-rejection additives if Wet Edge Extender has been added, as the flattening agent could be effected.

Summary Comment

Application of satin or SEMI GLOSS moisture cured polyurethane coatings require a higher degree of precision by users of the product. The final result is influenced by many different factors and apart from environmental conditions, the right application technique is crucial.

Customer Technical Service

For further technical advice call our 7 Day a Week Technical Hotline on **1800 812 864**.

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