



sikkens
WOOD COATINGS

Passion for wood

Recommendations for factory finishing of wooden windows and doors

Version: November 2002

I. Introduction

The aim of these recommendations is to define an industry-wide minimum quality standard for surface coating to thus achieve sustainable customer satisfaction with respect to the window finish quality.

The quality of windows and front doors is influenced by many factors. Besides the building situation, material, design, processing, physical stresses during building, and care, the surface coating also plays an important role.

The IPH-Arbeitsgruppe Oberfläche (IPH working group for surfaces), in which window manufacturers and the coatings industry collaborate to promote the development of surface quality, has revised the "Recommendations for the treatment of dimensionally stable building elements with water-based coating systems" published in 1996 by Fachverband Holz + Kunststoff Bayern (the Bavarian Association of Wood + Plastics) to reflect the current state-of-art and practical lessons learned.

The following recommendation includes basic rules and minimum technical requirements for the processing of water-based systems for dimensionally stable wood windows and doors.

II. Fundamentals

- VFF data sheet HO.02 - "Selection of wood qualities for wood windows and front doors"
- VFF data sheet HO.06 - "Wood types for window building - requirements, wood type table"
- Guideline "Laminated profiles for wooden windows" (i.f.t. Rosenheim)
- "Technical guideline for coatings on windows and exterior doors and other dimensionally stable outer components made of wood" (data sheet no. 18; publisher.: Bundesausschuss Farbe und Sachwertschutz, Frankfurt (Federal Committee for Paint and Asset Protection, Frankfurt, Germany))
- The following standards: DIN EN 942, DIN 68121 Part 1, DIN 18363, DIN 18355, DIN EN 152 Part 1, DIN EN 350 Part 2, DIN 68800 Part 3 (*when applying the standards, the current state-of-art must be observed!*)
- VFF data sheet HO.01 - "Classification of coatings for wood windows and doors," and the data sheets "Coating systems for wood windows; requirements for staining and opaque coatings for dimensionally stable components" and "Staining coating systems for wood windows and doors" by i.f.t. Rosenheim.
- VFF data sheet HO.08 "Measures for the protection of windows and exterior doors during the building phase"

(Publisher of the VFF data sheets: Verband der Fenster und Fassadenhersteller e. V., Frankfurt (Association of Window and Facade Manufacturers, Frankfurt, Germany))

Specific recommendations:

- The required dry film thickness must also exist at the edges. This can be achieved if the edges are rounded with a radius of at least 2 mm. The rounded edges must transition correctly to the adjacent area; the wood must not be crushed during profiling.
- To achieve rapid draining of water, horizontal surfaces must be avoided. The surfaces in question must be chamfered at an angle of at least 15 degrees.



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- All frame joints must be adhesion bonded with an adhesive as per load class D3 according to EN 204 and sealed (see also i.f.t. guideline "Adhesion bonding of wood windows, Part 2: Bonding of frame corner joints"). This also involves demonstrating temperature-resistance by testing according to prEN 14257 (WATT '91); the bond strength at $\tau_{80^\circ\text{C}}$ must be ≥ 7 N/mm.

Color:

- Bright stain colors require frequent maintenance (see data sheet "Staining coating systems for wood windows and front doors" i.f.t. Rosenheim). The color and the paint system must be designed to take into account the building load as per VFF leaflet HO.01 - "Classification of coatings for wood windows and doors".
- Contact of coated surfaces on other coated surfaces can cause damage during storage, transport and installation. It is therefore to ensure a sufficient gap between sash and frame.
- Before installing the building element, all areas of the frame that will not be coated later on (building connection area) must exhibit a dry film thickness of 50 μm , and all concealed surfaces in the sash, such as the glazing rebate must exhibit a dry film thickness of at least 30 μm (see also RAL Quality Guidelines Windows and Doors).
- Water-based paints are sensitive to frost. They must therefore not be stored below $+4^\circ\text{C}$ and not processed below $+10^\circ\text{C}$. The temperature ranges for storage and processing, stated in the technical data sheets and on the packaging, must be observed.
- During processing and the evaporation phase, the relative humidity in the room must be $60\% \pm 5\%$ and temperature must be $18 - 20^\circ\text{C}$.

III. Preparing the substrate

The wood moisture content must be $13\% \pm 2\%$.

The requirements for repairs as per EN 942 apply for repairing damage to the wood (inserting dowels, lamellas, fillers, etc.). The materials used must be suitable for exterior use and for the intended coating.

Specific recommendations:

For a high-quality surface coat you need a flat wooden surface, finely sanded, or planed without upstanding fibers. This is usually achieved by applying the following methods:

- To avoid crushing the cells in wood machining processes (e.g., fine planing, finishing), is important to change the tools in good time.
- Ripping open of the wood pores, resulting in a particularly fibrous surface or a "smearing," can be prevented by the choice of suitable sanding materials and changing them in good time.
- Before impregnation/priming, clean the wooden substrate to remove dust and dirt.

IV. Surface structure

1. Impregnation



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- For all types of wood, that are not classified in resistance classes 1 and 2 as per DIN 68364, colorless impregnation against blue stain and mold is required as per DIN 68800 Part 3.
- The effectiveness of the impregnation must be tested and documented as per EN 152.1 and EN 113 by awarding the RAL GZ-830 quality mark.
- The wood must be coated in a dipping or flow coating process.
- To ensure adequate adhesion of the subsequent coats, the drying times specified by the paint manufacturer must be observed as a minimum requirement.

2. Primer

- The next step is to apply a primer that combines coloring with sufficient wood fiber binding ability. The material must be applied in a dipping or flow coating process. Other methods must be agreed with the paint manufacturer.
- In case of intermediate sanding, all raised fibers must be removed by a suitable method. Please avoid sanding through the coat. If necessary, add a second primer coat; otherwise you can expect color differences and possibly adhesion problems.
- For this reason, sanding must not be performed until after mid coating.

3. Mid coat

- The building elements must be treated on all sides as per DIN 18363.
- Flow coating is recommended for this purpose. Other methods (dipping, spraying) are possible in consultation with the paint manufacturer. Please ensure that all weak points of the building element are sufficiently protected.
- If end-grain areas are still exposed, they must additionally be treated with a suitable end-grain preservative. This also applies to retroactive cuts.
- The parapet joints must also be treated with a suitable joint protection product.
- Glazing bars must be treated separately and coated on all sides.

Comment:

- Components which are delivered with intermediate coating and pre-assembled must be provided with a further coating within a period of 6 weeks after installation.
- Before applying the topcoat on-site, the intermediate coating may need to be cleaned and sanded, to avoid bonding problems.

4. Top coat

The final step is to apply a top coat. The entire coating structure must achieve a minimum dry film thickness of 100 µm, however, it must not exceed a maximum dry film thickness of 150 µm microns as a general rule. Thicker coat thicknesses impair the required diffusion capability of the coating system. This applies both to stains and opaque coatings.

To ensure the diffusion capability of the building element, make sure that the layer thickness on the outside is not greater than that on the inside (even with two-color components).

Remarks:

- The drying times and conditions specified by the paint manufacturer must be adhered to.



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- The recommended relative humidity must be observed.
- Continuous quality checks are the only way of ensuring continuous, high quality in factory finishing of wooden windows and doors. Quality assurance measures must include inspecting the incoming goods, constant production monitoring, and final inspection of the finished coated components. For more information on quality control, please refer to the RAL Quality guidelines for windows and front doors. Companies that are members of the HKH trade association can also contact their respective trade associations to learn more about opportunities for qualifying window building companies in the context of cooperation between the HKH associations and quality associations for windows and doors.

Notes on installation, maintenance and care

Keep to the state-of-art during installation. Information on this is provided by the "Installation Guide" of the published by the quality associations for windows and doors, and "Technical Guideline No. 20 - Installation of windows and doors" by the Federal HKH association.

Also note VFF data sheet HO.08 "Measures for the protection of windows and exterior doors during the building phase." The following are of particular note:

- Consider appropriate protection of windows and front doors against damage, e.g., by other building workers in the downstream process, and take appropriate measures.
- For reasons of building element protection, and for improved sealing options, the use of assembly frames is recommended.
- When masking the building elements make sure that only suitable adhesive tapes are used.
- Also, notify the building owner or construction manager of the necessary ventilation and dehumidification measures after installation, especially for new buildings.
- Always inform the owner and users of the care and maintenance work required for their windows and building elements. This specifically includes the use of maintenance products (maintenance milk), as this helps to substantially extend painting intervals.

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