

Working guideline for coating non-dimensionally stable and limited dimensionally stable construction elements

- Balconies – Canopies – Timber cladding – Wooden houses

General part

The present working guideline provides information on the processing of paints and glazes for the coating of non-dimensionally stable and limited dimensionally stable components.

For information regarding **Maintenance and Renovation** please follow our “**Working guideline for coating non-dimensionally stable and limited dimensionally stable construction elements - Maintenance and renovation**”.

The coating systems and substrates listed in the data sheets are to be understood as possible examples. Due to the large number of substrates and conditions, suitability must always be checked professionally. Further information is available on request.

Please follow our „Working guidelines for the sanding of wood“.

1. Processing instructions for water-based wood varnishes / coatings

1.1. Intermediate sanding

As protection against grinding and wood dust during the sanding procedure, we recommend a dust filter minimum P2 as personal protection equipment. In case of deciduous (hard) wood (especially for Beech, Oak) a dust filter P3 is recommended. Priority is given to the implementation of technical aspiration measures.

Water-based wood coatings are generally characterized by very good grindability. Usually the intermediate sanding is done with grit size 220 – 260.

Because of the thermoplastic property of water-based wood varnishes a too strong grinding pressure (and a therewith mostly combined temperature rising) should be avoided.

The quality of the wood sanding is decisive for the final colour. Dust off well after sanding.

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1.2. Colour accuracy

Colour deviations to the original sample can be caused by different batches, surface structures, gloss levels, application and light influences. The absorbency of the substrate, the drying behaviour and the weather conditions during processing may also lead to slight colour deviations. It is recommended to prepare a trial colour sample on the original substrate using the coating system selected in order to assess the final colour shade. In order to ensure uniformity of the colour shade, use only material having the same batch number on a given surface.

1.3. Correction of surface defects during coating

Raw wood

For small defects (less than 1 mm in depth) one-component wood fillers such as Grilith Holzkitt 50970 ff. or ADLER Feinspachtel 41099 can be used. For larger or deeper defects (more than 1 mm in depth) two-component polyester filling compounds (ADLER Woodfill-Reparaturspachtel 96856) must be used.

Filled areas on outside surfaces however are usually a weak spot and appear under the coating film after weathering over a certain period. A technically better alternative to a wood-filler on outside surfaces is the positioning of so-called wooden shuttles. For repairing knots see also DIN 68360-1.

Knots with a max. diameter of 10 mm cannot be claimed by the customer, if they are well connected (grown) with the circumfluent wood. Loose knots have to be drilled out and replaced with bonded wood plugs.

Finished coating:

To correct surface defects ADLER Holzwachsstangen (wax sticks for wood) in the shade of the final coat are suited. The wax sticks may only be used when coating is finished and not between the impregnation and/or the intermediate coat and the final coat, because blistering and damage on the coating film will appear.

1.4. Pre-treatment of the wood – sanding, planing

Water based impregnations cause the wood surface to be rougher compared to solvent based impregnations. Accurate sanding is therefore particularly important. The general information is also suitable for solvent-based products, however.

For **softwood** usually **grit size 120 or 150** is used, for **hard wood** (e.g. Meranti) **grit size 150-180**. Light cross sanding with grain 240 significantly reduces roughness after impregnation. It is very important to use sharp sand paper, because used sand paper presses the wood fibre on the surface instead of cutting it, and the water based impregnation raises the fibre once more. In the worst case the surface is polished which causes damages of adhesion of the coating film during weathering. Very smooth and uniform surfaces are achieved by fine planing (hydro planing, jointing).

At joints there is usually a maximum chamfer width of 0.5 mm for softwood and 0.7 mm for hardwood. If the cutters are stump the uppermost wood cells are destroyed although a very smooth surface may be achieved.

The absorption of the impregnation is reduced and flaking may occur in the course of weathering due to reduced adhesion of glaze or varnish.

With correct technique similar results can be achieved by sanding and hydro planing. On hardwood like Meranti hydro planing achieves slightly better results and wood fibres are raised less.

1.5. Blocking resistance

All thermoplastic coating systems for exterior use have a tendency to blocking under special conditions. Therefore all ADLER window coating systems are adjusted to a high blocking resistance. The good blocking resistance is regularly controlled and confirmed by independent institutes.

Blocking during production

This effect always happens, if coated elements are stacked without precautions during production or installation. By use appropriate distance holders (spacers) made from PE soft foam the problem can be solved. In cases of doubt it is possible to make compatibility tests in our Technical Application Department. Distance holders containing plasticizers must not be used due to the risk of marks and tears.

1.6. Film formation/ Minimum working temperature

For water-based ADLER varnishes/coatings smoothly dispersed synthetic resins, based on polyacrylate or polyurethane are used. The film formation of such dispersion lacquers happens only without defects, if a certain minimum processing temperature is respected. This temperature must be over the minimum film formation temperature (MFT) of the dispersion lacquer in question.

The temperature of the product and object, and the room temperature must be at least +15 C. If the coating is applied at lower temperatures, poorer mechanical and chemical resistance results; possibly even fissuring can appear.

If water-based coatings are to be successfully processed, the working areas must be brought up to the right temperature during the cold part of the year.

The temperature must not fall below the dew point.

1.7. Film protection / wood preservative

According to the application areas, the wood preservatives are registered, tested and approved as a product type "PT8" according to the biocidal products directive. A wood preservative, which is tested and effective according to the standards mentioned, has the abbreviation B, P, Iv and possibly T. Please note our work guideline "Wood preservation of dimensionally stable and limited dimensionally stable components according to DIN 68800 1-3".

In the case of products equipped with a film protection, biocides tested and authorised under the biocidal product directive are also used (type "PT 7" coating agent). These protect only the coating against blue stain and mould, however, not actively the coated wood against blue stain fungus etc.

1.8. Compatibility

Water-based paints must not be mixed with conventional solvent-based paints or thinners, because they are incompatible with each other in liquid form and specks immediately form. The reverse is also true!

1.9. Application tools

Only corrosion resistant tools must be used for water-based varnishes/coatings. If the spraying tools are used first for solvent-containing varnishes/paints, it is absolutely necessary to clean them well before water-based varnishes/coats are filled in. We recommend, to clean first with nitrocellulose or polyurethane thinner and to rinse afterwards with acetone. Then rinse with tap water till all solvent residues are removed.

If vice versa after the use for water-based varnishes a change to solvent-based varnishes is necessary, the cleansing process must be done in reverse order (1. water, 2. acetone, 3. nitrocellulose or polyurethane thinner).

Even when working with solvent-based paints, all work equipment such as brushes, spray guns, pipes, etc. must be thoroughly cleaned immediately after use. Putting them in thinners is not enough.

1.10. Drying

High levels of atmospheric humidity (more than 60 % relative air humidity) and low temperatures (below 20 ° C) increase the drying time considerably!

For good drying of painted areas, a sufficient removal of the water or solvent vapour arising during the drying process is necessary; a prerequisite for this is dry channels and dry spaces with well-functioning ventilation.

For stacking coated work pieces after drying, tailored spacers made from PE-foam are very well suited. See also 4.3.

To cover airing bars on trolleys we recommend PE hoses; PVC hoses are not suitable for freshly painted paint surfaces due to their plasticiser content.

1.11. Cleaning

Application tools should be cleaned well immediately after use with tap water. To remove dried paint residues we recommend using ADLER Aqua-Cleaner 80080 (diluted 1:1 with water).

In case of high contamination an exposure overnight is advisable. Residues of swelled water-based varnishes/coats can then be easily removed then using a grinding fleece (e. g. Scotch-Brite from 3M).

A subsequent cleaning of the working tools by acetone is advantageous, because in this case tools are drying quickly and ready for further use.

1.12. Spraying stations

For the application of water-based wood varnishes/coatings dry spray walls are suited as well as water rinsed spray walls.

In case of wet separation an appropriated water treatment cycle is necessary (addition of chemicals for coagulation and sedimentation). This cannot be arranged without a certain investment for the spraying station.

Coagulating agents adapted to the processing with water-based varnishes/coatings have to be used.

For lower processing volumes than approx. 100 kg a day dry spraying units are more economical.

1.13. Explosion prevention

The flash point of the most of water-based varnishes/coatings is over 55° C. Thus, the observance of the directives for explosion prevention in the respective coating rooms would be invalid.

But, as for cleaning purposes also in future solvent-based thinners or products based on alcohol (flash point below 21° C) could be used, we recommend electric devices with Ex-protection in coating rooms. In the case of solvent-based paints, explosive solvent vapour/air mixtures can arise during the spraying process. Therefore, electrically operated equipment used in paint rooms and the lighting must be explosion proof.

1.14. Waste disposal

Residues of water-based varnishes/coats and water for cleansing shall not be disposed into the sewerage system. They have to be transferred to a private or public waste collecting operator.

Residues of water-based varnishes and paint sludge from water-treatment facilities must be separately collected and labelled according to the waste register decree, BGBl. 570/2003 with the following key numbers (A = Austria respectively EAK = European Waste Catalogue):

Residues of water-based varnishes/paints and similar waste A: 55503 EAK: 080115

Cleansing water, polluted by water-based varnishes A: 55374 EAK: 140603

Press cake or sludge from the treatment with water-based varnishes or cleansing water (wastewater treatment facility, flocculation) A: 94801 EAK: 060502

Dust of water-based and solvent-based varnishes from a dry spraying station can also be disposed as industrial waste after having consulted the waste disposal contractor.

1.15. Storage

Because of their chemical composition and the high flash point, water-based varnishes are not subject to the “Decree about inflammable liquids – VbF”, BGBl. No. 240/1991. Nevertheless, electric installations in storage rooms should be equipped according to the protection class IP 54.

The floor of storage rooms must be liquid-tight, because water-based varnishes mostly are classified in the water hazard class 1 (WGK 1); the permission of the local authorities for the storage room is necessary.

Water-based window varnishes must be frost-protected during storage.

The average storage stability is normally 12 months. Always close opened containers well.

1.16. Sanitary protection

Work hygienic measures must be adhered to when processing paints. Generally the inhalation of aerosol particles from water-and solvent-based varnishes must be avoided. This is ensured by correctly using a breathing mask (combination filter A2/P2 – EN 141 / EN 143).

The residual solvents used in water-based wood varnishes (prevalently below 10 % by weight) usually have a very low MAK-value, nevertheless because of their low vapour pressure during proper processing it is not possible to reach concentrations in the air, which are of toxicological concern.

This is certainly an advantage compared to solvent-based coating systems, where the observance of the MAK-value always presents a major problem.

As protection against grinding and wood dust during the sanding procedure, we recommend a dust filter minimum P2 as personal protection equipment. In case of deciduous (hard) wood (especially for Beech, Oak) a dust filter P3 is recommended. However, priority is given to the installation of an aspirator.

The further treatment / removal of paint layers such as grinding, welding, burning off, etc. can cause dangerous dust and vapours. Always carry out with good ventilation and if necessary with appropriate protective equipment.

1.17. Rest emissions from coating films

Coating films of fresh varnished elements always contain a low percentage of residual solvents. Usually these solvents are emitted to the room air during the first months of use.

The period until these low concentrations of solvents disappear, depends on the local conditions and especially on the practice of ventilation by the user. The emission to the ambient air presents no danger or health risk for the resident, because of the very low concentration.

In some rare cases, mixed coating systems composed by solvent-based primer and water-based finishing coats are recommended. In these cases the following points must be observed:

The degree of residual solvent enclosed in a coating film at the beginning is decisively influenced by the processing method. The content is low, if the applied quantity of the coating material corresponds to the technical data sheets and the coated surfaces are dried at an intermediate drying time during one night at good ventilation (room temperature 20° C).

The following parameters delay the emission of solvents:

- High coating thickness of the single film layers
- Short intermediate drying time
- Low room temperature during the processing and the drying
- Low air renewal rates with low fresh air percentage during drying
- Quick assembling after coating

1.18. Advices and tips

Removal of resin

Resin as a natural wood component is present in some coniferous species of wood like Pine, Larch or Douglasie in substantial quantity. During weathering resin can penetrate the coating film and accumulate on the surface.

For removal never use cleaning agents containing alcohol, other solvents or abrasive fillers. There are two ways to remove liquid or solid resin from surfaces without damaging them:

- Remove mechanically liquid wax, e.g. using a little spoon. Clean this area afterwards with ADLER Entharzer Verdünnung and apply ADLER Top-Finish.
- Hard wax can easily removed in winter time. At temperatures around 0 °C natural resins are very brittle and can easily be removed without residues e.g. using a plastic spatula.

1.19. Service and maintenance of Color4You color dispenser

Please observe our „Working guideline for operating (including service and maintenance) Color4You color dispensers“ regarding gradation of color shades.

1.20. Dilution

Please observe the relative technical data sheets of the products. If not explicitly stated, please do not mix products with other products.

2. Notes on extending the durability of coated components

- If protection according to Önorm B 3802-3 against blue stain, wood-destroying fungi and insects is required, wood can be pre-treated with Pullex Aqua-Imprägnierung or Pullex Imprägnier-Grund (solvent based).
- The substrate must be dry, clean, capable of holding the paint, free from separating substances such as grease, wax, silicone, resin etc. and free from wood dust, as well as tested for suitability for coating.
- A prerequisite for ensuring long durability of the coating is to observe the basic principles of constructional wood preservation.
- For rough sawn substrates, the best possible durability is achieved!
- Raw wood outdoors must be coated immediately after exposure to the weather (UV radiation, precipitation, wind). Otherwise, reduced paint adhesion can be expected caused by a separating layer that forms. The degree of the problem of this separating layer cannot be determined by tests usually carried out on construction sites.
- On surfaces with heavy weathering, the use of rift sawn and quarter sawn boards is recommended. Plain sawn boards tend to peel off the top layers of wood during weathering and thus to cause large-area coating damage.
- A vertically mounted façade formwork is preferable to a horizontal one.
- Please observe and follow ÖNORM B 2230-1.

For more information on the subject of wood preservation, please refer to the ADLER wood preservative manual.

Please follow the indications in the technical data sheets and in the safety data sheets.