

# Surface treatment of door elements

For wood and wood-based materials outdoors

**Nr.002**

Technical data

## Introduction

Because stresses and technical requirements vary, the data sheet attached contains specific recommendations for treating the surface of exterior doors made of wood.

## Participating associations and organisers

FFF: Professional Association of Swiss Window and Facade Industry, Kasernenstrasse 4b, CH-8184 Bachenbülach

SIA: Swiss Society of Engineers and Architects SIA, Selnaustrasse 16, CH-8027 Zürich

VST: Federation of Swiss Door Producers VST, Kasernenstrasse 3d, CH-8184 Bachenbülach

VSSM: Swiss Association of Master Carpenters and Furniture Manufacturers VSSM, Gladbachstrasse 80, CH-8044 Zürich

Lignum: Swiss Forestry and Timber Industry Association, Falkenstrasse 26, CH-8008 Zürich

SMGV: Swiss Association of Painters and Plasterers SMGV, Grindelstrasse 2, CH-8304 Wallisellen

VSLF: Swiss Association of Paint and Coatings Manufacturers VSLF, Rudolfstrasse 13, CH-8400 Winterthur

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## **1. General**

### **1.1 Introduction:**

Many complaints from builders concerning the damage to paint on exterior doors can be avoided if the due attention is given to this issue in the planning stages.

Competent planning can prevent this by already specifying certain requirements in the tender for the building. The coating to be used depends on the following factors: the type and quality of the wood, the construction and workmanship as well as the climatic stresses. The renovation intervals that will be necessary depend on the combination of the above factors with the coating system that is ultimately selected (glazing or screening, light or dark).

Because stresses and technical requirements vary, the data sheet attached contains specific recommendations for the proper treatment of the surface of exterior doors made of wood and wood-based materials.

### **1.2 Scope**

This data sheet applies to first, reconditioning and renovation coatings (paints, lacquers, varnishes, finishes) used outdoors on dimensionally stable exterior components made of wood and wood-based materials with approved size changes to a very limited extent .

Exterior doors, including the inside, are to be considered as dimensionally stable exterior components.

## **2. The purpose of the coating**

The purpose of a coating is to provide an aesthetic design, protect the surface and to preserve the function of the wooden components.

Exterior components made of wood are exposed to the local environmental and weather stresses. These stresses are defined through moisture (air humidity, dew, fog, rain, snow, ice and condensation), rapid changes in temperatures and mechanical loads as well as the effects of various types of atmospheric chemicals. Wood coatings are not able to withstand the effects of heavy hailstorms.

Coatings are not designed and are not able to eliminate structural and wood-specific defects.

An important function of each and every wood coating is to reduce the amount of moisture that penetrates the wood. The aim is to therefore change the moisture in order to reduce or substantially prevent the wood from swelling and shrinking.

## **3. Components made of wood**

### **3.1 Constructions**

The construction determines the resistance of a component. A "constructive wood protection" is an essential prerequisite for a durable coating.

Outdoor wood components must be constructed in such a way that the water that falls on the surface is immediately drained off. The grain of the wood must be protected against the absorption of water. Sealing the surface with a "grain protection" is an additional technical possibility.

### **3.2 Edge formations**

Sharp edges mean that the thickness of the coating system has to be considerably thinner. It is advisable as a general rule to round the edges of the component.

It is necessary to round the edges if coatings that form a film are used and in the case of direct weathering. This must be agreed separately if applicable.

(SIA 343: All exterior, visible edges of the wooden section must be rounded with a minimum radius of  $r \geq 2$  mm)

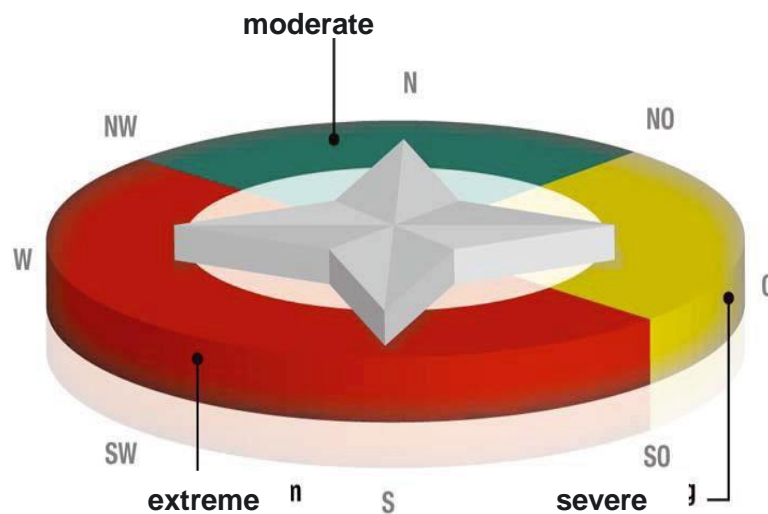
### 3.3 Requirements of the substrate (SIA 343)

- Permissible moisture content in solid wood before the first coat:  $13 \pm 2\%$  (measured depth with electrical resistant at least 30% of the cross-sectional measurement)
- Moisture content of the wood before the final coating: max. 15%.

### 3.4 Climatic conditions and constructive protection

The durability and protective effect of the coating also depends on the intensity of the weather stresses. It is generally assumed that the weather stresses on the north side of a building are relatively weak, whereas components made of wood on the southwest side, the weather side and any free-standing wooden constructions exposed to the weather are subject to extremely high stresses.

#### Direction of the exposure



- **moderate**  
Usually on the north side of a building (NW to NE)
- **severe:**  
Usually on the east side of a building (NE to SE)
- **extreme:**  
Usually on the south, southeast and west side of a building (SE to NW)

However, in practice, the stress conditions do not depend on just the climate, but also on the protection that the building or the wooden construction itself offers. Constructive measures, such as canopies, soffits and special covers can reduce the intensity of the stress caused by sunlight, precipitation and wind.

In addition, the stress put on the coated surfaces by the construction is divided as follows:

#### a) Protected wooden components



The wooden components are largely protected against the direct sunlight, precipitation and wind by adequately sized (wide) canopies, such as recessed exterior doors in deep soffits, balconies and access balconies.

## b) Partially protected wooden components



The prevalent outdoor climate can affect wooden components with little constructive protection through sunlight, precipitation and wind.

This is true for wooden components on buildings up to 3 storeys high in a sheltered position that have small canopies as well as recessed exterior doors in normal-sized soffits.

## c) Unprotected wooden components



The prevalent outdoor climate can affect the wooden components in full.

This applies, for example, to wooden components on buildings up to 3 storeys high in particularly exposed locations and on buildings over 3 storeys high, especially those with flush facades and projecting exterior doors (without structural protection) on all storeys. This building location / position must be refrained from in principle.

## 4. Stress conditions and requirements for the surface treatment

### 4.1 Stresses

The stress of the coating can be determined from the evaluation of the climatic conditions and the construction according to the following table.

Determining the stress according to SN EN 927-1/1997

|                           |                     | Climatic conditions |        |         |
|---------------------------|---------------------|---------------------|--------|---------|
|                           |                     | moderate            | severe | extreme |
| Construction<br>Component | protected           | weak                | weak   | medium  |
|                           | partially protected | weak                | medium | strong  |
|                           | not protected       | medium              | strong | strong  |

The classification of the regional climate into "moderate, severe and extreme" is also based on precipitation and sunlight.

The Swiss Plateau, for example, should be classified as severe to extreme as the direction of the exposure (weather side) and the height of the installation have a great deal of influence.

In addition to the stress caused by heavy rain and the sunlight, new buildings often suffer from an additional exposure to moisture as a result of the increased moisture in the building.

The manufacturers of the coating materials and coating systems must provide product information, which contains the classification of the products.

Likewise, the manufacturer must offer a recommendation for the substrate of the coating.

The requirements that must be made on the surface treatments depending on the type of component, are laid out in the standard SN EN 927-1/1997.

| <b>Requirements on the dimensional stability of wooden components</b> |   |   |
|---|---|---|
| Type of component   | Permitted dimensional alteration to the wood  | Typical examples                                  |
| Components with none or little dimensional stability                  | Free dimensional alteration                   | Wooden board cladding, weather boarding, pergolas |
| Components of average dimensional stability                           | Limited dimensional change permitted          | Tongue and groove panelling, garden furniture     |
| Components with very high dimensional stability                       | only very small dimensional changes permitted | Windows, doors, shutters                          |

## 4.2 Tips and information for specific use

### 4.2.1 Choosing the appropriate paint system

The coating of the wooden part is determined by the type of wood used and the anticipated stress on the surface. The individual coatings of a coating structure must be coordinated and compatible with the sealing profiles and sealants.

The recommendations of the coating manufacturer for the application and processing should be used.

| <b>Recommendation for the type of paint to choose depending on the weather stress and the necessary dimensional stability of the wooden part</b> |   |   |  |
|--|---|---|--|
| Weather stress   | Necessary dimensional stability                                 |   |  |
|  | none or low   | medium  | high   |
| moderate   | thin glazing layer slightly pigmented                           | medium glazing layer slightly pigmented                 | Clear varnish <sup>1)</sup> thick glazing layer slightly pigmented |
| severe   | thin or medium glazing layer heavily pigmented                  | medium glazing layer                                    | thick glazing layer heavily pigmented or covering coat             |
| extreme  | thin or medium glazing layer heavily pigmented or covering coat | medium glazing layer heavily pigmented or covering coat | covering coat with high film thickness                             |

1) Not suitable for components exposed to weather stress

The paints recommended for components exposed to extreme weather stress, with high demands on the dimensional stability of the part, can of course also be used on parts and areas with lower demands and requirements.

Types of wood with a high capillary absorbency capacity for water and consequently high fluctuations in shrinking and swelling, with the risk of becoming highly soaked, e.g. pine (sapwood) and silver fir, require a stronger moisture resistant and more elastic coating than the significantly less absorbent types of wood (e.g. spruce, larch).

Types of wood that contain other ingredients, e.g. tannic acid, resins, require, in many cases, a special coating structure to prevent the ingredients from penetrating the coating.

The surfaces with dark coatings reach significantly higher temperatures in strong sunlight than those in lighter colours. This results in increased cracks caused by drying. This speeds up the warping of the door.

#### **4.2.2 Application instructions**

The coating material must be processed in accordance with the processing guidelines of the product manufacturer.

#### **4.2.3 Advice for maintenance and renovation**

Characteristic signs of the weathering of paints are: flat weathering, localised delamination and formation of cracks, changes in colour and the chalking of the paint.

Damages to the paint must be rectified as quickly as possible otherwise they will impair the protection the treatment of the surface provides against the penetration of moisture.

When wood is wet, it can be destroyed by fungus. Wood damaged by rotting must be replaced prior to the renovation.

The following points in particular should be noted for doors:

- It is very important that the moisture content of the wood is adequately low at the time when a new coat is to be applied (<15%).
- If the exterior paint is being restored, its water vapour tightness must not be greater than that of the interior paint already applied. Otherwise there is the risk that the moisture diffused from the inside is blocked by the exterior coating and this will ultimately lead to flaking.
- As a rule, the thickness of the layer on the inside and the outside should be the same and/or have the same number of coats (layers).
- The condition of the glass sealing, i.e. the sealing profile, putty or sealing compound of the door must be checked. Areas that are loose or damaged must be repaired regularly.
- Open joints of the frame wood must be sealed; this is best done on site with an elastic wood filler compound.
- When restoring a door, in principle, the condition of the interior paint should also be checked and also renewed if necessary.

#### **4.3 Ecology**

The recommendation sometimes given to dip doors in impregnation products that impede the growth of fungus and bluing, should not be seen as "intensive" impregnation according to the Clean Air Act.

Doors that have been removed are therefore "old wood" and not hazardous waste. However, it is generally recommended to dispose of old wood with a treated surface and possibly with residue of putty glue in waste incineration plants and large industrial plants that have a correspondingly high standard for the flue gas cleaning process and a controlled disposal of the ash.

The materials chosen for the coatings should be as sustainable as possible. The exposure figures (BZ) published in the recommendations of the coordination of the construction and property bodies of the federal KBOB erfa-info 2/97 are used as the basis for the ecological evaluation.

#### 4.4 Exterior doors

Recommendations for new and renovation coats.

Exterior doors and gates are technically efficient components of a sophisticated design that are subject to high demands on their sealing properties and durability. In order to meet these demands, exterior doors must have effective constructive wood protection. They must also be properly protected with an effective coating, especially in the lower areas (against the effects of splashing) .

Lining, blind and block frames as well as cladding/panels must be painted, impregnated or stained under the same processing conditions.

If the surface of the wooden parts will no longer be visible after the **installation**, it must still be protected with the same primer (base coat). Depending on the type of wood and the stress, it may be necessary to use anti-bluing and anti-fungal products for the base coat.

#### 4.5 Doors frames made from Iron-Zinc (IZ) and Zincor sheet metal

Recommended coating system:

Clean and degrease the substrate, apply a primer and one to two top coats or two paints with two-component paint based on epoxy or polyurethane resin.

The coating must be selected on the basis of the stress on the structural situation, the local climate and the recommendation of the product manufacturer.

The technical data sheets of the paint manufacturer and the technical data sheet 003 "Protection and installation of steel door frames" must be observed for the processing sequence.

#### 5. Surface temperatures depending on the shade of colour

Coatings in darker shades for outdoor use lead to increased surface temperatures (up to approx. 80°C).

When the surface of a softwood that is high in resin is warmed up, it causes the resin to leak out. That is why it is not advisable to use darker coatings outdoors on highly resinous softwoods.

An increase in the temperature makes the coated wood dry out all the more which will lead to the formation of more cracks. Furthermore, it can also result in the increased distortion of the door panel since it exceeds the standard temperature value of the test class "e".

#### Surface temperatures for covering coatings

(Source: BFS Data Sheet No.18)

| RAL Colour No. | HBW | Colour shade   | C°      | Shade                      |
|----------------|-----|----------------|---------|----------------------------|
| 9001           | 76  | Cream white    | 40 - 50 | light tint<br>HBW 100 - 50 |
| 1004           | 42  | Gold yellow    |         |                            |
| 1015           | 67  | Light ivory    |         |                            |
| 2002           | 16  | Blood orange   | 50 - 65 | medium tint<br>HBW 40 - 30 |
| 3000           | 12  | Fire red       |         |                            |
| 3003           | 8   | Ruby red       | 65 - 80 | dark tint<br>HBW 30 - 0    |
| 5007           | 15  | Brilliant blue |         |                            |
| 5010           | 9   | Gentian blue   |         |                            |
| 6011           | 20  | Reseda green   |         |                            |
| 7001           | 31  | Silver grey    |         |                            |
| 7011           | 12  | Iron grey      |         |                            |
| 7031           | 16  | Blue grey      |         |                            |
| 8003           | 12  | Clay brown     |         |                            |
| 9005           | 4   | Deep black     |         |                            |

**HBW** Reference to lightness coefficient.

The HBW helps compare the colour shade. In the new versions of the NCS colour cards, the colours are documented with the HBW.

## Surface temperatures for glazing coatings

(Source: BFS Data Sheet No.18)

| Glaze colours              | C°      | Shade       |
|----------------------------|---------|-------------|
| "Nature" and/or colourless | 50 - 60 | light tint  |
| Light brown                |         |             |
| "Oak"                      |         |             |
| Medium red                 | 60 - 70 | medium tint |
| Medium brown               |         |             |
| "Teak"                     |         |             |
| "Nut"                      | 70 - 80 | dark tint   |
| Dark brown                 |         |             |
| Anthracite                 |         |             |

The surface temperatures listed are measured values. Because the warming up of the surface depends on various factors, even the time of day or year and the geographical location, these values cannot be considered as absolute, but rather as relative values.

The classification of the colour shades into the categories of light, medium and dark tints runs on a continuous spectrum.

### 5.1 Tips and information on selecting the shade of colour

In order to meet the requirements of a door that is not warped and will not warp, the impact of direct sunlight must not be underestimated with simple door constructions.

The following recommendations should be considered in the process:

- Do not use medium to dark colour shades for exterior doors exposed to direct sunlight.
- Do not use dark colour shades for exterior doors that are partially protected.
- Only use dark colour shades for exterior doors that are well protected.

## 6. Coatings

Coatings for exterior wood items are liquids that are applied to the substrate. The coating provides protective, decorative and /or other specific properties.

Users need to differentiate between base, intermediate and final coating materials, which can be colourless, glazing, or have an opaque pigment, are solvent-based or can be diluted in water.

### 6.1 Distinction by type

#### 6.1.1 Distinction by the type of solvent

The nature of the solvent determines the application properties of the paint. The binder is responsible in the main for the properties of the dried film of paint.

Solvents do not just make it easier to apply the paint material (optimisation for applying by roller or spray method), they also react with the substrate.

Organic solvents do not make wood and wood-based materials swell, or only marginally, whereas water can make the fibres in the wood and compressed fibres swell a lot to varying degrees.

Consequently the swollen wood has an uneven surface, which must be levelled out by means of grinding for optimum results. The solvent responsible to a very limited extent for the penetrability of



the coating material. The depth of the penetration is influenced primarily by the size of the binder's particles.

### 6.1.2 Distinction by the type of binder

In addition to the decorative roles of the coating (colour shade, gloss, texture, etc...), the film of paint must protect the wood against weathering and the variations of the wood's moisture content as much as possible. **Protecting the wood means: Protection against light and water.**

The binder must therefore be substantially UV-stable, absorb the smallest amount possible of water and demonstrate a high resistance to the diffusion of water vapour.

### 6.1.3 Distinction by coverage capacity

- Without pigment, completely transparent, colourless (natural treatment, clear varnish). Lets the colour of the wood show through, but does not offer enough protection against sunlight, therefore it is not resistant against direct weathering, or only resistant to a limited extent.
- Pigmented a little to moderately, semi-transparent (glaze paint). Allows the texture of the wood to come through, protects against sunlight but not fully.
- Covering pigment (gloss paint, top coat). Protects completely against sunlight. The texture of the wood does not come through, but rough surfaces (e.g. roughly sawn, brushed) stand out.

### 6.1.4 Distinction by the thickness of the layer

- Impregnating glaze or varnish, thin-coating scumble glaze:

Medium dry layer thickness 0 µm to approx. 20 µm. Roughness of the wood's surface comes through completely, low moisture protection and dimensional stability of the wood. **Not suitable for components that are dimensionally stable**

- Medium layer glaze, covering pigment (gloss paint):

Medium dry layer thickness over 20 µm to 60 µm.

- Thick layer glaze:

Medium dry layer thickness over 60 µm. Roughness of the wood's surface is largely even, good protection against moisture and dimensional stabilisation.

The level of protection against moisture is largely determined by the thickness of the paint layer.

## 6.2 Types of coatings:

### 6.2.1 Clear lacquer

Clear lacquers and varnishes ("colourless glazes") are coating materials that do not contain a pigment, and as a general rule do not offer sufficient protection against the wood being damaged by the sunlight and in particular against UV rays.

That is why colourless coatings cannot be used on exterior doors that are subject to severe and extreme weather conditions, unless they contain special radiation protection properties.

Protective characteristics that work for longer against the sun's rays can only be attained if the thickness of the layers is very thick and with the use of radiation protection filters (UV absorbers).

The manufacturer is responsible for demonstrating the product's adequate UV filtration effect.

### 6.2.2 Glazing coating material

Wood glazes (varnishes, stains) are transparent coating materials with a low pigment content that produce a colour-transparent coating on the surface of the wood.

A distinction must be drawn between impregnating glazes and film-forming glazes that can be either solvent-based or diluted with water.

### 6.2.3 Impregnating glazes

are products with a low solids content, which are based on solvent binders or binders that can be diluted in water. When one layer is applied they produce a dry layer that is under 5 µm thick (minimum layer-forming).

### 6.2.4 Layer-forming glazes

are products that when one layer is applied produce a dry layer that is over 5 µm.

### 6.2.5 Dispersion coating material

for wood (also referred to as wood paints or weatherproof paints) are pigmented coating materials that can be diluted in water, and are especially suitable for use on wood outdoors.

### 6.2.6 Dispersion gloss paints

are pigmented dispersion coating materials that can be diluted in water, they are made of plastic dispersions and pigments and additives to create coatings that look like paint finishes.

### 6.2.7 Gloss paints (alkyd resin paints)

are pigmented paints that can be diluted with solvents and are used outdoors on wood as a binder base, usually long alkyd resin lacquers.

## 6.3 Thickness of the layer

### 6.3.1 Requirements of the coating thickness

(SIA 343 - 4.2.1.5.4) Ideally the entire coating for the exterior and entrance doors is applied at the factory. If the treatment of the surface is completed solely at the factory, the thickness of the layer at the factory is at least:

- for covering coatings: 100 µm,
- for glazes, clear coatings: 60 µm.

If a part of the treatment of the surface is completed on site, the thickness of the layer at the factory is at least:

- for covering coatings: 80 µm,
- for glazes, clear coatings: 50 µm.

Coatings that have been damaged as a result of subsequent machining or processing must be repaired in keeping with the construction of the layer(s).

### 6.3.2 Dry layer thickness

The thickness of a coating is influenced by the product-specific coating material. The thickness of the dry layers is classified into four levels for the product information provided by the manufacturer, in accordance with SN EN 927-1:

Levels for the dry layer thickness of coating systems:

| Level   | Layer thickness range                       |
|---------|---|
| minimum | average layer thickness under 5 µm          |
| low     | average layer thickness 5 µm to 20 µm       |
| medium  | average layer thickness over 20 µm to 60 µm |
| high    | average layer thickness over 60 µm          |

(Source: BFS Data Sheet No.18)

## **7. Coating system**

A coating system is the structure of the individual coats (made from coating materials) as a whole.

The checks and preparation of the substrate always form part of the coating process.

Before the coating system, a preventive blue stain protection agent may be applied if necessary which with some products can be done in a single step with the base coat.

### **7.1 Base coats**

The first layer of a coating system on the wood is the primer. This coating improves the adhesion properties, protects against corrosion, reduces the absorbency capacity of the substrate and/or the bonding and also acts as a barrier. Attention needs to be given to the preparation of the end-grain and V-joints in the process.

Any necessary preventive treatment to protect the wood can be applied in one step with the base coat in the application of the corresponding products.

There are the following variants of the base coat for the wood coating:

- with a blue protection stain
- with an impregnating agent (colourless)
- with a glazing base coat material
- with a glazing base coat material

### **7.2 Intermediate coatings**

Every layer between the base coat and the top coat.

Each component and ingredient in a coating system must be coordinated and compatible with each other.

### **7.3 Final coating / Top coat**

Final layer of a coating system.

#### **Guidelines:**

Dimensionally stable exterior wood components, in particular exterior doors are coated on all sides with a base coat and an intermediate coating before being installed, and then at the latest immediately after being installed a second intermediate coating is applied followed by the final coating.

It should be ensured that, for example, "spy holes", hinge recesses and notches/milled edges for locks are also provided with sufficient primer to prevent any moisture from entering.

Since the components can be exposed to considerable stress caused by moisture whilst they are stored on the construction site and because of the moisture contained in the building itself, it is advisable to measure the content of moisture in the wood before applying any further coatings.

#### **Intermediate coatings**

Must not be exposed to the stresses of the weather for more than half a year without a final coating. (Refer to the Coating thickness before the final coating according to 6.3.1)

## **8. Durability of wood coatings**

### **8.1 Ageing and wear of wood coatings**

Coatings on wood and wood-based materials in outdoor areas are exposed to a high level of climatic stresses. All coatings are subject to a natural process of ageing, wear and deterioration, even if they are perfectly technically designed and implemented and the correct materials have been used.

Signs of wear and tear after the product has been used in compliance with the contractual specifications and/or natural wear do not constitute material defects.

The protection against the effects of the weather and the visual appearance of the coatings as well as the protection of the coated components can only be preserved over many years by means of regular and proper maintenance measures.

### **8.2 Colour and changes in colour**

The colour (commonly referred to as the "shade") of the coatings will change when exposed to the effects of light, the weather and the environment. This is true for both covering as well as glazing coatings.

If the coating is transparent, the colour of the wood may become darker or lighter.

### **8.3 Damage caused by hail**

The impact of the hailstones can damage the coating and possibly even the wood's surface.

## **9. Tips and information for maintenance**

Checking and repairing individual damages in time, on a regular basis is a prerequisite for ensuring the long-term preservation of the appearance and function of all surface treatments on exterior components made of wood.

Glaze coatings have to be reworked more frequently than covering coating systems because the durability of the protective effect of glazing coatings is generally estimated to be shorter.

*In order to maintain exterior doors properly, the checks should also include the condition of the interior side of the door. It must also not be possible for the moisture to penetrate the wood from the interior side of the door, because then the moisture will penetrate through the wood and result in the growth of wood-decay fungi as well as impair the adhesion properties on the exterior coating and warp the door.*

**To maintain the function and value of exterior doors, it is advisable to conclude an inspection and maintenance contract with regular inspections (Maintenance Plan).**

### **9.1 Servicing**

Servicing entails the maintenance of the components by means of regular care (cleaning) and functional tests including surface inspections, including minor repairs to preserve their function, protection and appearance.

### **9.2 Repairs**

Repairs encompass all the measures required for restoring the function, protection and appearance.

### **9.3 Renovation paints**

The renovation intervals depend on the stress, type of wood, coating, colour shade and care. Coatings under a little amount of stress maintain their coating for the longest time and only require low level maintenance. Products under greater stress must be treated at shorter maintenance intervals.

An annual inspection by the building owner or preferably by a professional painter (a service contract is advisable), can provide information on whether the paint needs to be restoring and to what extent.

As a fundamental rule, the recommended intervals for renovations must be complied with, as recommended by the manufacturer of the paint or varnish.

Signs of damage caused to the paint by weathering usually show first on the lower parts of the products. If carried out in time, the cost for the renovation will be low.

The remaining surface areas only need to be painted over once after cleaning.

In order to maintain exterior doors properly, the checks should also include the condition of the interior side of the door. The moisture must also be prevented from penetrating the wood from the interior side of the door.

## 10. Standards, guidelines and data sheets

Standards

SN EN 927-1:1997: Classification and selection

SN EN 927-2:2006: Performance requirements

SN EN 927-3:2007: Natural weathering

SN EN 927-5:2007: Liquid water permeability

SN 257:2005 Painting, wood staining and upholstering work

SIA 343 Doors and gates

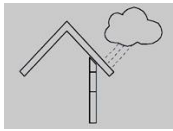
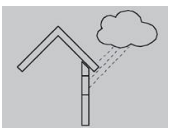

### FIRST DETERMINE THE STRESS GROUP FOR THE DOOR ...

Using this table, you can instantly determine the relevant stress group for exterior doors. Factors such as the overhang of the roof, the type of door installation and the location of the building all play a decisive role.

You can calculate the degree of weathering as follows: "0" means no weathering, "4" stands for extreme weathering.

The "stress groups" always apply to the weather side of the building; the side that is sheltered from the effects of the weather has a lower stress grouping of one (Group 2) to two (Group 3 and 4) levels. Larger roof overhangs or recessed exterior doors can significantly reduce the stress and lengthen the renovation intervals.

Source: sickens

| Roof overhang |   | Door installation     | Location of the building  |  |           |
|---------------|---|-----------------------|---------------------------|--|-----------|
|               |   |                       | Level and 1st - 3rd floor | Detached slope/hillside position or from 3rd floor | Mountains |
| Large         |  | set back              | 0                         | 0  | 1         |
|               |   | flush with the facade | 1                         | 1  | 2         |
| Medium        |  | set back              | 1                         | 2  | 3         |
|               |   | flush with the facade | 2                         | 3  | 4         |
| Small         |  | set back              | 2                         | 3  | 4         |
|               |   | flush with the facade | 3                         | 3  | 4         |

## Stress Groups and weathering on the weather side

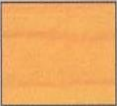







|   |                      |
|---|----------------------|
| 0 | = no weathering      |
| 1 | = slight weathering  |
| 2 | = average weathering |

|   |                      |
|---|----------------------|
| 3 | =severe weathering   |
| 4 | = extreme weathering |

... AND THEN FIND THE RIGHT COATING!

### Softwood

This table provides a clear overview of which coating can extend the renovation interval. Because the length of time between the renovation intervals varies depending on the stress group, the type of wood and coating (glazing or covering). A necessary prerequisite is that the construction, design, coating and installation are all coordinated with the regulations pertaining to dimensionally stable components. Damages must be reworked and repaired immediately.

| Type of wood | Softwood  |   |   |   | Tropical and hardwood  |   |   |   |
|--------------|---|---|---|---|--|---|---|---|
|              | glazing   |   | covering  |   | covering   |   | covering  |   |
|              | light   | medium and dark   | light and medium  | dark  | light  | medium and dark   | light and medium  | dark  |
|              |  |  |  |  |  |  |  |  |
| 0            | Green   | Green   | Green   | Green   | Green  | Green   | Green   | Green   |
| 1            | Light Green   | Light Green   | Green   | Green   | Light Green  | Green   | Green   | Green   |
| 2            | Yellow  | Light Green   | Green   | Light Green   | Light Green  | Light Green   | Green   | Green   |
| 3            | Red   | Red   | Yellow  | Yellow  | Red  | Yellow  | Light Green   | Yellow  |
| 4            | Red   | Red   | Orange  | Red   | Red  | Red   | Yellow  | Orange  |

Renovierungsintervalle in Jahren

■ 5 und mehr Jahre   
 ■ 3 - 4,5 Jahre   
 ■ 2 - 2,5 Jahre   
 ■ weniger als 2 Jahre   
 ■ deutlich weniger als 2 Jahre

Source: sikkins

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 This data sheet is based on the present level of technology, provides knowledge and experience and should also help promote the mutual understanding of the parties involved in the process.  
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Further data sheets can be found on [www.vst.ch](http://www.vst.ch)

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