

Service – maintenance – notes for wooden front doors

- Ensuring the serviceability
- Technological and structural boundary conditions

**Information
for the
building owner**

Overview:

Entrance doors in differential climate	page 2
Leaks in front doors	page 3
Structural WINTER boundary conditons for front doors	page 4-5
Structural SOMMER boundary conditions for front doors	page 6
Wooden front doors in the construction phase	page 7
Maintenance and servicing of wooden front doors	page 8



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Service – maintenance – notes for wooden front doors

Entrance doors in differential climate

When closed, an entrance door represents a physical separation between the indoor and outdoor climate. It should not be forgotten that there are only a few centimetres of wood, insulating material and possibly glass between the rather uniform indoor climate and the outdoor climate, which fluctuates strongly over the annual cycle.

Every material reacts physically to the environmental conditions. Changes in temperature lead to changes in the length of the materials used. In addition, fluctuations in relative humidity cause wood to swell or shrink. Translated with www.DeepL.com/Translator (free version)



The pictures show examples of the extreme effects on front doors. Alternating between cold/damp and warm/dry, it cannot be expected that an entrance door will remain completely flat. This statement applies regardless of the materials used, i.e. wood, plastic or aluminium. From a technical point of view, it is therefore important that any inevitable warping does not lead to any functional restrictions on the front door.

There are no "maximum warpage dimensions" in millimetres. Experts agree that a defect is only given when an increased air passage can be determined and/or the closing ability is inhibited and/or the warping is already visible to the naked eye. Translated with www.DeepL.com/Translator (free version)

Leaks in front doors

Modern front doors are equipped with one or more sealing levels between the door leaf and the fixed frame. These elastic sealing profiles reduce uncontrolled air passage and thus contribute to heating energy savings. The seals are also an essential component of the sound insulation capacity.

Nevertheless, there can be no absolutely airtight front door, as this would require techniques from the aircraft industry. For this reason, absolute air tightness is not required by the legislator in the Energy Saving Ordinance, nor do the relevant test standards specify an air passage "equal to zero". Translated with www.DeepL.com/Translator (free version)



Sealing layers in a door leaf

According to the recognised rules of technology, air tightness class 2 must be ensured for front doors. Based on the relevant test and classification standards, this means that, for example, at a wind force of 2 Beaufort, an air passage of up to 0.79 m³ per hour and running metre of joint is permissible and usual.

At a wind force of 6 Beaufort and a door size of 2.0 x 1.0 metres, a total of up to 40 m³ of air per hour may pass through. A corresponding door construction is still to be classified in air tightness class 2.

Therefore, the perception of a slight air draft in the joint area does not automatically cause a deficiency. Rather, it must be checked in each individual case whether the effect of the seals is limited by incorrect adjustment, ageing of the seals or other influences.

Service – maintenance – notes for wooden front doors

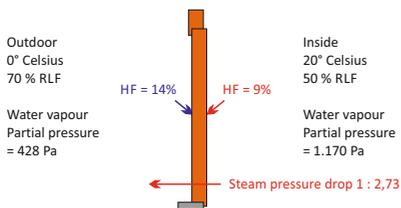
Structural WINTER boundary conditions for front doors

A front door represents a separating layer in a "differential climate". During the heating period, an average of about 20° Celsius with a relative humidity between 40 and 55 % prevails on the room side. On the outside, double-digit sub-zero temperatures and a relative humidity of up to 100 % are the norm.

The material wood reacts to the relative air humidity with a change in the wood moisture. In the winter situation, the wood moisture on the outside of the door is several percentage points higher than on the room side. Due to the unavoidable working of the wood, a limited door leaf distortion occurs because of the wood moisture difference.

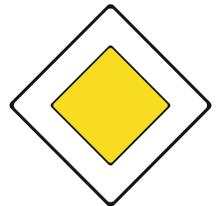
The winter climate is as it is. However, the indoor climate can vary considerably depending on the type of building and use. This results in building physics boundary conditions that can have a significant influence on the warping behaviour of wooden front doors. The following examples illustrate the different situations:

Important influencing factors: Standard room climate

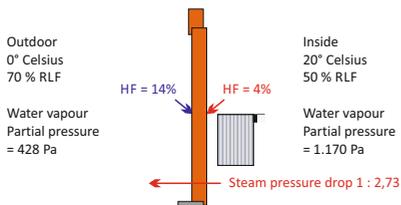


The diagram describes the rather uncritical case of underfloor heating in the hallway or floorboard area.

On the door leaf surfaces, there is a difference in wood moisture of 5% between inside and outside.



Important influencing factors: Radiators



The presence of a radiator in the immediate vicinity of the door causes the inside surface of the door leaf to dry out considerably.

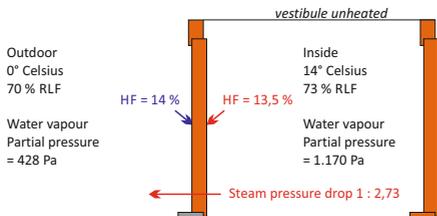
In the example, the wood moisture difference is approx. 10 %, the distortion of the door leaf is increased.



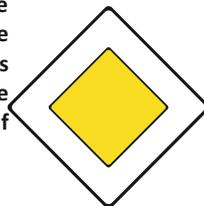
Service – maintenance – notes for wooden front doors

Structural WINTER boundary conditions for front doors

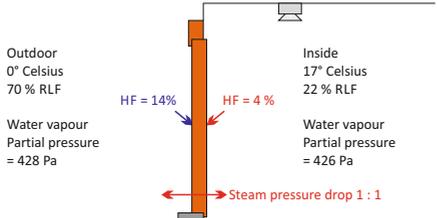
Important influencing factors: Vestibule



An unheated porch has a positive effect. The slightly increased relative air humidity in the vestibule reduces the wood moisture difference on the door leaf surfaces. A door leaf distortion is rather small.



Important influencing factors: Ventilation system with heat recovery



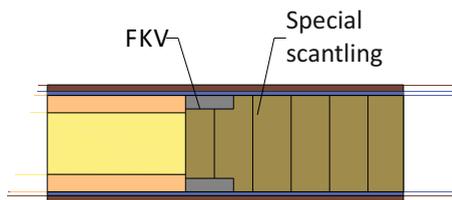
Ventilation systems with heat recovery lead to low room air humidity in the cold season. The inside surface of the door leaf dries up accordingly, a door leaf distortion is favoured.



The examples are intended to illustrate that radiators in the vicinity of doors and ventilation systems with heat recovery can lead to rather critical physical building conditions in wooden front doors.

VARIOTEC offers a multiplicity of different door leaf types for aforementioned reasons. The task is to select the right door leaf for the respective object. For humidity-technically critical situations, for example, the product Allwetter/W is available. In buildings with ventilation systems and heat recovery - usually low-energy and passive houses - door leaves with 78 to 100 mm thickness are the right choice.

Let the VARIOTEC technicians advise you.



The patented special scantling of the door leaf type Allwetter/W has additional vapour barrier layers. This reduces the wood moisture gradient in the door leaf core and thus a door leaf distortion.

Service – maintenance – notes for wooden front doors



Structural SOMMER boundary conditions for front doors

The symbolic power of a front door has changed over the past decades. The rather conservative "calling card of the house" has become an element of façade architecture. This has been accompanied by changes in the installation situations, element sizes and colour schemes.

In the meantime, large-format entrance doors with dark grey or even black surfaces are not uncommon. The orientation of the façade and the installation level in the outer wall are primarily determined by the architectural idea. One should not forget the surface temperatures that occur on dark surfaces that are exposed to direct sunlight.



There is no significant shading. With this bright red colour, surface temperatures of up to 60° Celsius are generated.



With the colour "anthracite", temperatures of up to 75° Celsius are even generated. The modern paint systems are not able to slow down the drying process on the outside of the door leaf sufficiently when exposed to sunlight. As is the case with plastic and aluminium, this results in door leaf distortion, which can cause operating obstacles. Dark front doors and direct sunlight are generally a problem.

However, there are technical possibilities to realize such front doors. The basis for this is the recognition of the critical situation and consultation with the manufacturer. With special constructions, e.g. facing shells made of plywood, MDF or aluminium, many wishes of the building owners and architects regarding the colour design can be realised.



Don't be afraid at "Le Corbusier", Villa Savoye, built 1929-1931 The old master was clever enough to provide the dark door in a very shielded installation position on a north-west façade.

Service – maintenance – notes for wooden front doors

Wooden front doors in the construction phase

Are you having a kitchen or a wall unit installed during the construction phase? No, of course not, because the moisture from screed, plaster and painting work would cause damage. Everyone knows that!

And your new wooden front door? Of course, it should be installed early so that the object is lockable. This often means "moisture stress" on the door construction.



A wooden front door is made of solid wood and wood-based materials.

**All surfaces are varnished.
Just like furniture!**

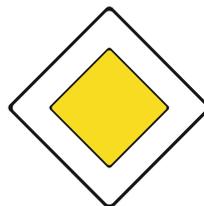


The surface coating (paint) protects against rainwater and other short-term moisture exposure. However, it is not able to keep the sensitive wood sufficiently dry during prolonged periods of building moisture.

Especially screed and plastering work leads to moisture peaks lasting several days, which inevitably cause a wooden front door to swell. Not infrequently, colour damage is the result. In extreme cases, so-called creep deformations occur due to warping, i.e. the material structure is displaced and the door leaf remains permanently crooked.



**With a temporary door leaf during the construction phase, moisture damage to the actual front door leaf can be avoided.
Not expensive, but extremely effective.**



Maintenance and repair of wooden front doors

Front doors are utility products that require regular maintenance. Every operator of a structural facility, i.e. every house owner, is even obliged to carry out maintenance under the respective state building regulations. For the maintenance and repair of building products, building law has the following definition: "Measures to delay the reduction of the existing stock of usage". This somewhat unwieldy paraphrase does indeed contain the essence of the work to be carried out. The point is to prevent damage from occurring in the first place. For the building product front door can be derived as follows:

- All moving parts require regular lubrication. Metal parts of hinges and door locks rub against each other. Abrasion only occurs when a separating lubricating film is missing. The lubricating film must therefore be refreshed regularly. Instructions for carrying out the procedure can be found in the manufacturer's instructions for use.
- A surface coating on wood does not have unlimited durability. Natural ageing, weathering and especially UV radiation lead to decomposition processes, cracks and detachment. Depending on the colour tone and intensity of weathering, a renovation coat is required at intervals. The interval can be less than 4 years for heavily weathered wooden front doors with dark colours. In this respect, it may well be the case that the client/builder should carry out a renovation coat during the warranty period. In this constellation, this is no longer the task of the contractor. Information on the renovation intervals to be carried out, the processes and products can be found in the manufacturer's information.
- It cannot be expected that a front door will remain in position for years with millimetre precision. Climatic influences inevitably lead to component movements which, in extreme cases, can have an effect on the ability to open and close the door. Modern entrance doors offer a wide range of adjustment options with which one can react to the circumstances. It is important to carry out the adjustment work at an early stage. Clamping doors and stiff locks do not improve with continued use. The adjustment options on hinges and door locks are described in the product information.

The effort for professional maintenance of entrance doors is not great. However, it is extremely important to observe the maintenance intervals. A maintenance contract with the door manufacturer is a good way to maintain the value of the entrance door for a long time.