Ampack AG • Bautechnik
Seebleichestrasse 50
Postfach
CH-9401 Rorschach
Tel. 071 858 38 00 • Fax 071 858 38 37
ampack@ampack.ch
www.ampack.ch

Installing vapour checks in winter shell

Introduction

This document describes the special features of working with vapour checks and airtight layers during the winter months, it illustrates some phenomena and provides some hints for faultless processing. It is not intended to serve as installation instructions. The product-specific installation is described in the data sheets. If required, a wide variety of topic brochures can be downloaded from the Ampack AG homepages for the relevant country. For further detailed enquiries you will also find the contact details of your external sales force partner, internal sales and the application technique on the Ampack AG internet pages.

General

Which situations are paramount in a winter shell?

During the winter months a damp micro-climate develops in the interior of buildings, in particular in conventional masonry and concrete buildings, that quickly develops into a "cool steam grotto" if there is not sufficient ventilation. Long periods of rain or fog bring with them a very damp external atmosphere, so that the building is unable to dry off. Construction areas where work has been discontinued for a longer period of time and that are not being monitored are particularly critical.

Also buildings that are prefabricated or traditional timber constructions can become extremely damp, especially if damp is imported into the building via other forms of work or if moisture is transported from other, already existing parts of the building (bricked or concreted cellar) into the hygroscopic building materials on the upper floors.

Absorption of moisture through storage on the construction site

A long period of storage of thermal insulation materials or materials for the airtight layer including the necessary adhesives is not permitted. The result of such storage would be severe moisture absorption with the ensuing loss of their material properties. Paper-based membranes expand, which results in the occurrence of draughts at the overlaps and edge connections when the paper dries out later. Damage cannot be ruled out. Depending on the material, moisture-variable vapour checks can also show this undesirable characteristic, as they have hydroscopic qualities according to the material used.

Storage in a dry atmosphere and timely transportation to the building site prevent problems. Storage in a damp atmosphere is a risk factor!

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Damp surfaces and adhesives
It is impossible to apply an adhesive to a damp or wet surface. Most manufacturer's instructions specify a dry surface. Water or frost work as an interface, which is only too clear from driving in winter. This has to be accepted. Special adhesives for such use in the area of the laying of membranes are an exception and are not dealt with in this document.

Visible water on the surface is generally referred to as wetness. But what is damp? This question should make you aware of the problem! There are surfaces that are not wet or damp to the eye, but that nevertheless could contain huge quantities of moisture. As examples we have bricks or plaster. If adhesives are used on such surfaces the moisture that they contain is trapped inside and then it collects at the interface between the adhesive and the surface during the whole drying out process. Just as with car tyres, this can lead to a loss of grip ("aquaplaning of adhesives") in a flash. Conclusion: Only use adhesive on really dry (in case of doubt measured) surfaces!

Low temperatures
The temperature given by the manufacturer must be observed. This applies for the material used, the ambient temperature and naturally also for the surface on which the adhesive is to be used. Depending on the material this temperature can fluctuate. However, in general it can be said that today's adhesives clearly become less effective at bonding vapour checks and airtight layers at temperatures under 5 °C. Few adhesives are able to cope with lower temperatures. Permanent bonds should not be attempted under 0 °C. In addition, it should be noted that most adhesives only build up their bonding characteristics over a certain period of time. If the temperature is low this process clearly takes longer. In addition, adhesives bond far less effectively at low temperatures.

Danger of frost with water-based products.
Many liquid adhesives and primers are water based nowadays. These products can clearly freeze at temperatures lower than 0 °C. Depending on the raw material base, the adhesive can be damaged by this. This is where the term resistance to freezing comes into play: Temperatures below this temperature necessarily lead to the damage of the product and should therefore be avoided at all costs. Storage in vehicles over the weekend in freezing conditions is not permitted.

If it is no longer possible to extract the adhesive by squeezing, if the adhesive has a grainy texture or pure water with lumps of adhesive is extruded, it is highly probable that the product is damaged and can no longer be used.

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Construction phenomena

Condensation on the outer side of the vapour checks or airtight layer
From time to time it has been noted with surprise that moisture or even droplets of water are visible on the outer side of the vapour checks or airtight layers. This is a normal occurrence to be found in the physics of construction. During the construction phase and before the installation of the vapour checks or airtight layer, the building can have retained (a lot) of moisture for the aforementioned reasons. This is entirely natural if the lower levels are made of brick or concrete and a timber construction with thermal insulation is only used in the roof space. This water occurrence comes from the interior of the construction and has nothing to do with the barrier effect of the membrane used.

In a damp winter climate the conditions for drying out buildings are far from ideal. Drying out towards the centre of the room is scarcely possible due to the increased ambient air humidity. And externally we have the same situation. Which means that the moisture largely remains in the building. A lack of ventilation (e.g. after the windows and doors have been installed) aggravates this situation further.

What is the reason then that this phenomenon occurs only on the south side? The sun shines on the south side and forces the moisture into the interior of the construction. Therefore the insulation there is damper. It is possible that the interior of the building is colder than the exterior and thus the moisture then condenses on the cold vapour checks or airtight layer and then becomes visible.

The fact that this problem does not occur on the north side or occurs less frequently is to do with the fact that the sun never shines on the wall and that the moisture is distributed "more evenly" and so does not become visible or becomes visible less quickly.

All you can do here is wait until the materials have dried out. It is important that the building is well ventilated so that the moisture is driven out and the building can dry out both internally and externally. Particularly damp areas may have to be opened up and dried out using standard construction site driers, but this has nothing to do with the choice of membrane selected.

The installation of the thermal insulation and the vapour checks or airtight layer should fundamentally occur at the same time. Any time delay must be avoided. If this should, however, prove unavoidable, the moisture in the (timber) construction and the moisture in the thermal insulation must be measured and if necessary they should be dried out using a standard construction site drier before the membranes are installed. Adhesives that have been penetrated by water quickly lose their properties.

Dry heating of building components or buildings and ventilation
The heating of buildings in winter, following the installation of windows and doors, can result in extremely high humidity in the building, particularly if the building is insufficiently aired during heating. Just warming the air does not result in the drying out of the building. It is essential that this warm and moisture-filled air is extracted. Regular ventilation with the windows wide open or having the

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windows half open on a permanent basis with simultaneous use of the stove is recommended. With half-open windows it can be helpful to create a through draught from the basement to the attic, which will be better able to drive out the warm, damp air.

However, it must also be noted that the fast cooling of the ambient temperature should be avoided (switching off the heating in the building over the weekend or public holidays with closed windows) as this will cause the ambient air humidity to rise dramatically.

If a gas stove is used for heating, the exhaust air from this stove must be carefully channelled out of doors. The exhaust air usually contains considerable amounts of water vapour which is counter-productive to the drying measures, i.e. it just increases the ambient air humidity.

The implementation of professional dehumidifiers (condensation driers) has also proved to be useful, however, in this case ventilation by opening the windows in very damp weather is to be avoided (senseless dehumidification of the outside air that comes in). The water collection containers must be emptied regularly in order to ensure the permanent operations of such driers and must be organised. Otherwise they shut down and are ineffectual or do not perform as required.

Special characteristics of moisture-variable membranes
The aforementioned information on drying building shells applies in principle regardless of whether a vapour check with a fixed or variable s_D-value was installed in the building The correct heating and ventilation are essential here. In a "dripping wet" shell membranes with a moisture-variable s_D-value cannot fulfil their moisture-protecting function for the construction. Permanent air humidity of more than 70% during the construction phase is unacceptable. In the period of use of the building short peaks in air moisture content in the kitchen or wet rooms are not a problem.

Concerns in the case of high ambient air humidity
In the case of permanent ambient air humidity of more than 70% there is the risk of mould growth on wood-based boards, plaster boards, paper-based vapour checks. For the same reason the unnecessary over-heating of rooms in the building is to be avoided. This just increases the risk of mould.

Existing rules and recommendations to ensure damp protection in the shell
Many standards and craftsmen's rules set out the maximum moisture content for building materials, and/or require adequate ventilation to avoid damp and the growth of mould and they also recommend additional measures. Certain work can no longer be carried out if the ambient air humidity is too high. These country-specific rules must be observed. Ampack's external sales force will be happy to advise you further on this topic.

Installation

Mechanical fixation

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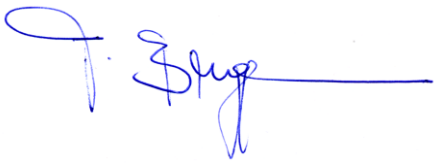
Mechanical stress on the bonding of airtight membranes must be avoided and/or is not permitted. The bonding of vapour check membranes or airtight membranes is not a mechanical securing process. Appropriate measures must be taken for the mechanical securing of the installed membrane against strain loads, e.g. load distribution or fixing by means of battens or similar.

Drying times for primers and liquid adhesives
Care must also be taken - depending on the situation and the product - to ensure that the extended drying times for the adhesives used are observed, e.g. liquid adhesives from the cartridge for the edge connections or the primer used. For ecological reasons many products are water-based nowadays, which means that they take longer to dry.

Summary
The building shell in winter presents special challenges and not just for the caftsmen. The materials used are also affected by this situation and can be pushed to the limits of their performance. By observing and complying with the instructions given, nasty surprises can be avoided.

Ampack AG, Switzerland



Ulrich Höing
Head of Technics and Development

Patrick Bruggmann
Application Technology

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