

Avoiding winter problems on exterior joinery

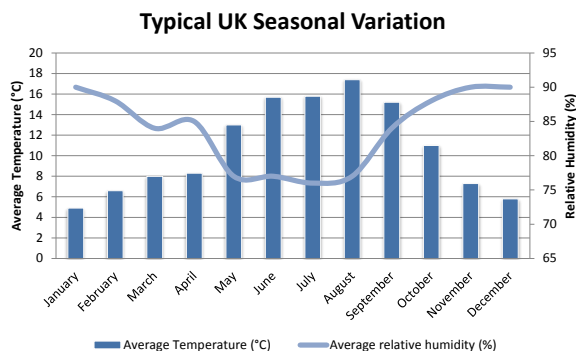
Cold weather brings the risk of paint freezing during transport and storage; site problems, caused when joinery is installed before the paint has fully cured; and high levels of ambient moisture, which cause joinery to swell and joints to open.

It is not surprising almost 80% of problems related to factory finished joinery result from items manufactured and supplied during winter months, from November to April. However, a few simple actions can help minimise cold weather disruption and avoid expensive rework.

Avoiding problems

Most winter site problems are caused to either one or a combination of two factors:

- low temperatures; which affect the storage, drying and curing of the coating system
- High humidity; which causes excessive dimensional movement in timber, opening joints to moisture and causing door sets and windows to “stick”



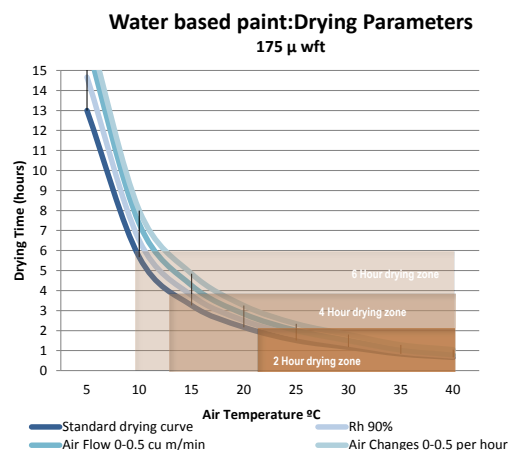
Rectifying these issues on site adds cost and frustration for everyone involved, but some simple steps on distribution, storage, during joinery manufacture, and on site during construction can greatly reduce, and often avoid completely, the problems associated with winter conditions.

Factory painting and drying

Modern coating systems dry and cure in two stages. During the first stage - coalescence - water and solvent evaporate from the wet film, and the resin system closes

and tightens. The paint will appear dry to the touch before evaporation is complete, but may still be moisture sensitive and some components, such as stain blockers, will not yet be fully effective.

The graph below shows a typical coalescence curve for water based acrylic paint. At lower temperatures, and with poor airflow, coalescence times are significantly extended, so although the paint may feel dry, it will still hold significant moisture.



Achieving a uniform coalesced film is critical to performance. If water is not removed fully, the film will be disrupted, will not cure uniformly and remain susceptible to moisture, blistering and staining.

Curing

As coalescence nears completion, the paint film starts to chemically cross link, becoming less porous, and increasing toughness and adhesion. This is known as curing.

In summer, or in a well controlled drying area, full cure is achieved in a few days, but in winter the process slows, stopping completely close to freezing point, though restarting as temperatures rise.

It is important joinery is fully cured before external exposure. If not, it remains sensitive to blistering and extractive staining and in winter, will remain vulnerable until the weather eventually warms and curing is complete.

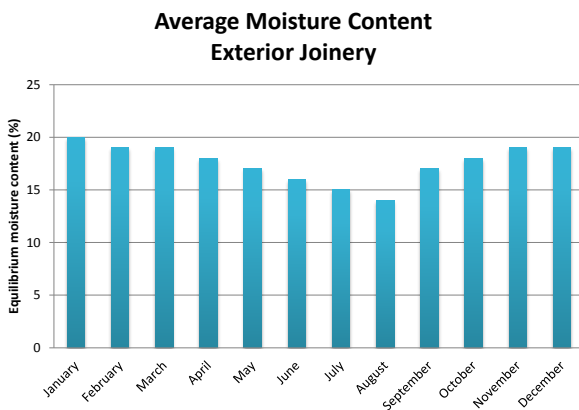
Practical steps in the factory

Some simple steps will help the paint cure before the joinery is shipped to site:

- Keep paint in a heated store before use and never leave paint cans on a cold concrete floor.
- Follow the film thickness specification. Over application is wasteful and slows the drying process.
- Maintain a warm temperature of 15-20°C in the drying area, using a background heater or ducted, filtered, warm workshop air. Use simple fans to maintain air circulation.
- Leave heat and air circulation fans on overnight. In cool, still air very little drying will take place.
- Don't try to accelerate drying by blasting hot air at joinery items. This will speed up surface drying, but trap moisture in the film and slow down the coalescence process.
- Delay wrapping finished joinery for as long as possible. Wrapping and storage in an unheated despatch area will slow or stop moisture release from the film preventing full coalescence and curing.

Timber moisture content

The ambient moisture content of exterior joinery varies significantly through the year and is generally independent of any treatment or finishes applied to it.



Dimensional change is a function of species and grade, but broadly timber dimensions vary by about 1% for every 3% change in moisture content.

In winter, it is not untypical for joinery to leave the factory at around 10% moisture content, sometimes lower if using laminated sections, then rapidly condition to 18-20% on site. The resulting 3 - 4% dimensional changes cause joints and seals to open, letting moisture penetrate unprotected end grain and rebates.

Storing timber before processing a well ventilated, covered, external area will allow it to equilibrate with ambient conditions and help avoid over drying.

Practical steps on site

- Remove airtight packaging, prior to storage, to allow free ventilation of the joinery.
- Store joinery off the ground on suitable bearers and cover with a permeable sheet to protect from contamination.
- Storage areas should be well ventilated and not subject to extremes of temperature. Avoid unsuitable storage, such as metal box containers, which may be subject to condensation and become very hot in direct sunlight. Water can also collect in protective wrapping leading to saturation of some components.
- If joinery is installed prior to completion of internal wet processes, gentle internal heating, good ventilation and the use of de humidifiers will greatly reduce the risk of blistering and delamination as the building dries out.
- Remove plaster and other building materials contamination immediately with a solution of detergent and rinse with clean water.
- Ensure that any on site assembly or modifications are fully protected: particularly cill joints, glazing beads and glazing systems. Unprotected end grain exposed by site modifications must be properly sealed and protected with two generous brush coats of Teknoseal 4000.

Further Information

Information sheets covering: Drying Parameters, Moisture Content and Machine Tolerances, and Site Care and Storage are available from the Teknos Service Centres listed below:

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