Curing of Waterborne paint

(focusing on interior)

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General paint curing methods

• Waterborne	Evaporation
• Oil based	Oxidation (reacts with oxygen)
• 2K Epoxy/Urethane	Chemical reaction
• Moisture cured polys	Reaction with moisture in air

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Key Points on waterborne curing

- Waterborne paint dries through the evaporation process (water & solvents simply evaporate into the atmosphere)
- Ideal drying conditions are 15-20°C, less than 75% RH, with gentle airflow to move moisture away
- Coalescing & full curing of a coating takes around 5-7 days in ideal conditions (ie doing all the things it needs to so it's durable)
- In cooler months if your clothes on the line aren't drying your paint won't either

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What's in a can of paint?

- BINDERS stick the paint together, form a film and give adhesion
- PIGMENTS to colour the paint, control gloss, prevent corrosion, add bulk and other properties.
- SOLVENTS to make paint useable.
- THICKENERS to hold the wet paint in suspension, prevent sagging.
- ADDITIVES to do all the little, but important jobs.

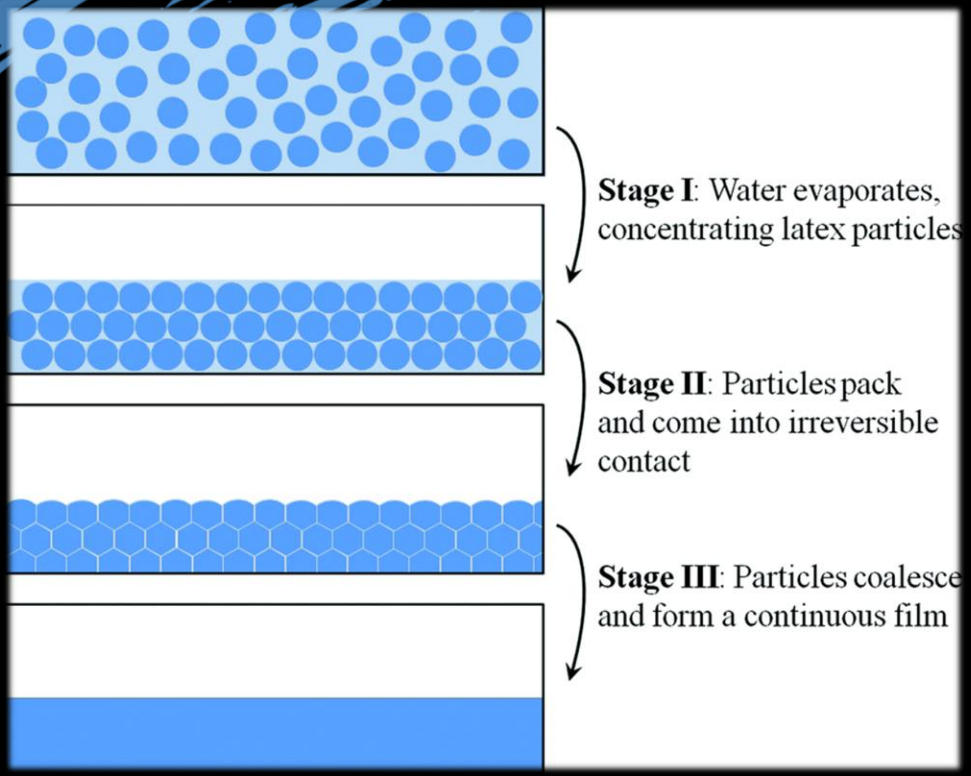
Time taken through drying/curing process

(in ideal conditions)

Event	Time
Water evaporation	0 to 3 hours
Coalescing solvent left behind	0 to 3 hours
Resin particles move together	½-3 hours
Coalescing solvent softens resin	½-3 hours
Last water leaves film	1-6 hours
Resin particles fuse together	1-3 hours
Coalescing solvent leaves film	1-5 days
Glycols, leave film	0-5 days
Film fully dry	About 1 week
Resin properties remain stable	10 years +

As you see the initial release of moisture occurs within a few hours however full coating coalescing can take many days in ideal conditions

Coalescing process
(in simple terms)



Stage 1 & 2 along with early phase of Stage 3 occurs in a matter hours

End of Stage 3 process takes many days

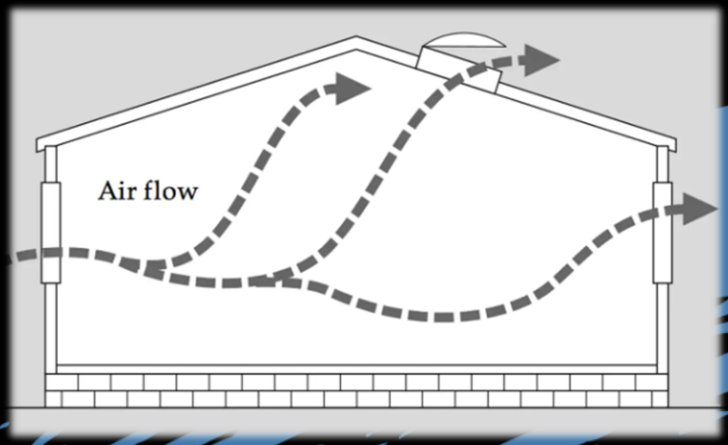
What affects drying & curing of paint?

Humidity

- Lower Humidity levels assist drying
- Moisture has to evaporate into atmosphere
- Over 75% Relative Humidity waterborne paint will struggle to dry, over 85% RH it won't dry
- Waterborne paint increases RH of an Interior as moisture evaporates into atmosphere

Common problem areas:

- Painting regionally with High humidity (Summer & Winter)
- Residential & Commercial interior masked out with film and little airflow
- Painting into evening then property closed up

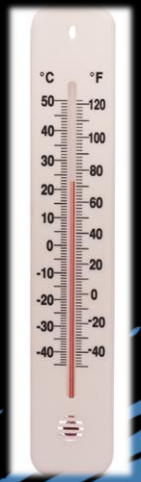


Airflow

- The moisture in paint has to go somewhere
- Needs to be moved out and away
- Open doors and windows to allow airflow through
- Use extraction fan units

Common problem areas:

- Residential interior masked out with film and not removed after painting
- Commercial interiors with no airflow or extraction units
- Painting into evening then property closed up



Temperature

- Warmer temperatures speed up drying (additives can be used to slow drying)
- Cooler temperatures slow drying
- Too cold and it won't dry

Common problem areas:

- Warmer - If paint dries too quickly difficult to achieve a quality finish (over textured surface and brush & roller marks occur)
- Cooler – patchiness can occur due to retained moisture in coating. If too cold coating may never coalesce properly

Re-coat time

- Recoat times are based on ideal curing conditions. 2 hours in ideal conditions.
- Low airflow, high humidity, low temp will extend re-coat times

Where issues occur:

- 2 coats applied to soon – patchiness & sheeriness will present as moisture for 1st coat hasn't had time to release

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Time
(generally)

- Coatings require time to fully “set up” and cure to access their performance potential even in good conditions
- In adverse conditions curing time can be greatly extended

Where issues occur:

- Residential Interiors in colder monthly
- Commercial properties finished and furniture etc (or workers) move in next day
- Overnight painting in commercial environments still operating

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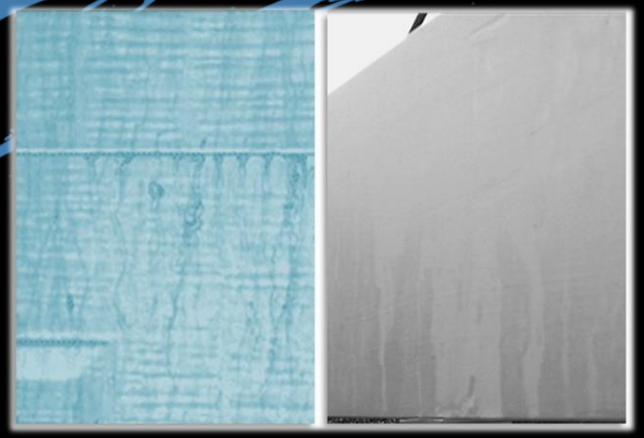
Common issues when drying/curing affected



Surfactant Leaching

When waterborne coatings are hit with moisture too soon after painting. Water mark are left on the surface. Typically occurs in Bathrooms

Burnishing

Surface subjected to scrubbing /rubbing soon after painting (often by commercial cleaners) leaving visible marks across surface. Far more obvious in darker colours

Important factors to focus on for Interiors

- AIRFLOW — open windows/doors, use extraction fans Good airflow is needed
- HUMIDITY — be aware of high humidity
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- TEMPERATURE — be aware of high or low temps and work accordingly
- TIME PERIODS — give paint a chance to cure fully

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