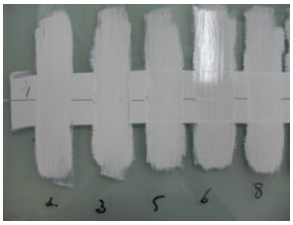
Choosing the right coalescent

Application
Paint

Objective
Monitor the effect of a coalescent of the open time and film strength

Device
HORUS®



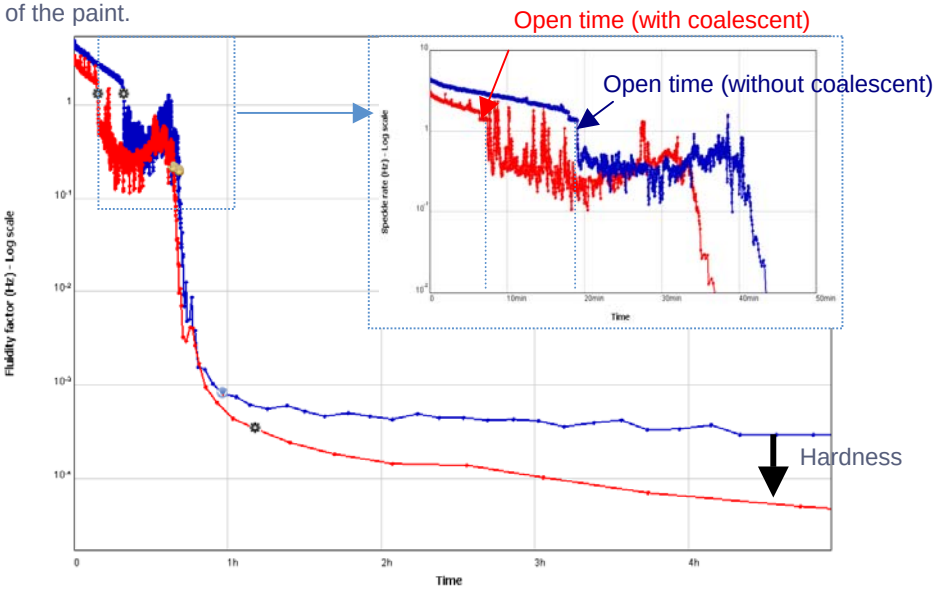
Coalescent	Open time	Hardness
With	8 min	5.10^{-5}
Without	19 min	3.10^{-4}

* see application note “Finding the right open time”

INTRODUCTION
Coalescent is one of the most common raw material found in the composition of waterborne paints. It is added to a water-based system to improve film formation (*i.e.* hardness) by temporarily lowering the T_g of the latex, providing mobility to the polymer chains. The softened polymer can then flow and chains can fuse with each other, creating a protective and decorative film.
Choosing the right coalescent for a water-based coating is a balancing act. Adding one type of coalescent to achieve optimal performance in one area can often adversely affect a coating's performance in another. Typically the coalescent decreases the open time, while giving better hardness to the film.

COMMON METHOD
The coalescent acts directly on the open time* of the paint by decreasing its duration, hence giving less time for the user to correct his work. The common test method for evaluating the open-time of paints involves casting a uniform film of paint and then making a mark in the paint immediately. Over a progression of timed intervals while the paint dries, the operator brushes into the finish and evaluates how effective the brushing was at removing or repairing the initial mark that was made. The open-time corresponds to the time until which the mark can still be removed.
This method remains subjective and tedious. **Morever it only gives information on the open time and not on other properties of the film like hardness.**

HORUS® METHOD
Two samples of waterborne paint with and without coalescent have been tested on glass at 120µm (wet thickness). The sample with no coalescent (blue curve) has a longer open time, hence the film remains fluid over a longer period of time. With coalescent (red curve), the open time is shorter but the final level is lower, indicating a harder film. The addition of coalescing agent enables to get a strong film, resistant to abrasion, however the open time is reduced, leading to a more difficult application of the paint.



CONCLUSION
By using the Horus®, the effect of the coalescing agent on the open time and film hardness is highlighted, enabling an easier adjustment of the paint formulation.