

Switching to an environmentally friendly drier



INTRODUCTION

Driers are catalyzers, which promote or accelerate drying, curing or hardening of oxidizable coatings. They are usually metallic salts of monocarboxylic acids (Cobalt, Manganese, Iron, etc.), which promote the absorption of oxygen by the film, as well as catalysing the formation and decomposition of peroxides. Driers based on cobalt are commonly used but they are blacklisted by various environmental legislations (R.E.A.CH, etc.). It is therefore important to find a replacement for them. They can be replaced by manganese based driers, when color is not an issue (give a dark hue), as it is better for the environment. However, changing the nature of the drier can significantly modify the drying mechanism of the paint.

Application

Paint

Objective

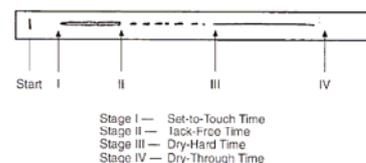
Monitor the effect of changing the drier on the drying times

Device

HORUS®

COMMON METHOD

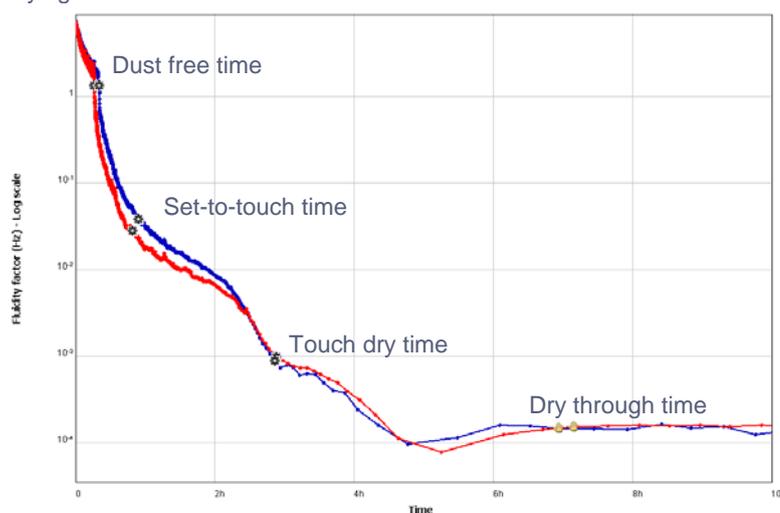
To test the film forming properties of their formulations and the influence of the nature of additives, such as a drier, paint formulators can use a mechanical recorder (ASTM D 5895 – 03). They analyse visually the trace left by a needle drawn through the drying film at a constant speed. The length of the different types of marks gives drying times such as dry-to-touch or dry-hard times. However, the marks are not always clear and open to subjective interpretation, which **often leads to poor reproducibility and repeatability.**



HORUS® METHOD

Two samples of solvent-borne paints with two different driers (cobalt and manganese) have been tested on metal at 60µm (wet thickness). The reference sample with a cobalt based drier (red curve) needs to be replaced by a manganese based drier (blue curve) in order to pass the environmental constraints of R.E.A.CH. Looking at the two identical kinetics below and the very close drying times (see table), the formulator can easily decide to switch for manganese as it does not modify the drying mechanism.

Drier	Dust free	Set-to-touch	Touch dry	Dry through
Cobalt	16 min 30 s	49 min 14 s	2 h 52 min	6 h 56 min
Manganese	20 min 53 s	54 min 42 s	2 h 53 min	7 h 09 min



CONCLUSION

By using the Horus®, the right drier can be chosen in order to fulfil the environmental constraints.