



Solvent release from coatings

Solvents are among the liquid components of coatings commonly referred to as the volatile vehicle. Upon application, and for some time afterward, the solvents evaporate, leaving the vehicle solids behind, which form the dry and cured coating film. The volatile vehicle(s) / solvent should be understood to be transitory components used in liquid coatings because of two principal properties: solvency and release rate. The first, solvency, relates to the ability of any given solvent to dissolve a resin and produce a homogeneous solution. Solvency is also an important property because it controls the coating's viscosity for application purposes.

The second property, release rate, is important for the film-forming properties of the coating. The applied coating film may require both rapid and slow solvent release. Rapid release is primarily due to evaporation, the first stage of solvent release. Slow release is primarily controlled by solvent diffusion from the applied coating film. Evaporation allows the film to build and achieve the targeted wet film thickness (WFT) without running or sagging. However, slower release (diffusion) allows the coating to wet-out on the substrate (promoting adhesion) and also allows the atomized coating to flow-out into a uniform film. Therefore, solvents are formulated into coatings to provide for a liquid application that "dries" at a rate that determines film build and surface wetting.

Solvent release from a coating should be viewed as a two-stage process. The first stage is related to evaporation rate, which is a function of volatility, temperature, and vapor pressure (of the solvent) at the surface. The second stage is the diffusivity rate. Solvent loss can be hindered by increasing the viscosity of the film, film thickness and the degree of curing, such as in crosslinking, which is an ongoing process.

International Paint coatings are formulated and tested using solvents to give the required dry times and application properties at the stated dry film thickness as specified on our technical datasheet. The addition of any thinners or excessive film builds will affect the rate of solvent release from an applied coating.

For a coating applied at mid-point wet film thickness as stated on our technical datasheet and without thinning, we would expect the volatile organic compound level to decay to a negligible level 72hrs after the hard dry time. Any addition of thinner >5% by volume would increase this time by 24hrs. An increase of wet film builds by >50% will also add on another 24hr period. Please be aware that an increase of film thickness of more than 50% could lead to solvent entrapment problems like bubbling, pinholes, blistering, flocculation etc.

For example:

Interzone 954 has a hard dry time of 5.5hrs at 25°C when applied at 325µm DFT / 440µm WFT. This means that after 77.5hrs (5.5hrs + 72hrs) the VOC level emitted will be negligible.

Interzone 954 has a hard dry time of 5.5hrs at 25°C when applied at 325µm DFT / 440µm WFT with the **addition of 7% of thinner**. This means that after 101.5hrs (5.5hrs + 72hrs + 24hrs) the VOC level emitted will be negligible.

Interzone 954 has a hard dry time of 5.5hrs at 25°C when applied at **488µm DFT / 660µm WFT** with the **addition of 7% of thinner**. This means that after 125.5hrs (5.5hrs + 72hrs + 24hrs + 24hrs) the VOC level emitted will be negligible.

Generally, when a coating is fully cured the level of VOC emission from the coating film will be nil or unmeasurable.

Kind Regards,



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