"Surface-Migrating" Additives to Improve Stain Resistance of Coatings

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Often times, those clean walls in your house will become stained with household chemicals. Increasing the stain resistance of the water-based latex paints has become increasing difficult due to regulations restricting the use of volatile organic content or solvents. The hypothesis in this project is to add additives that will come to the surface to increase the stain resistance, while not reducing any other qualities of the paint. Different surfactants based on fluoro-chemicals and silicones with different ionic structures (nonionic & Amphoteric) were selected and added at different levels and tested on both Leneta Charts and on wood blocks. Stain resistance with various hydrophilic stains – Mustard, Wine, Cranberry juice, Coffee were selected. The hypothesis that the addition of surfactants based on fluoro-modified and silicones that come to the surface will assist in improving stain resistance is supported, while also improving other coatings properties. There was significant gain in gloss, and also an improvement on the flow and leveling properties of the paint. The Nonionic surfactant showed good all round properties for gloss, flow and leveling and stain resistance. Amphoteric surfactant surprisingly showed excellent improvement in adhesion and gloss but extremely poor stain resistance. Silicone surfactant showed an unusually excellent stain resistance only for wine and provided significant gain in adhesion. It was also evident that stain resistance can be obtained even at levels as low as 0.5% - increasing the level did not provide any extra protection. It was interesting to note that a good reading of the hydrophilic stain resistance can be obtained within 30 minutes rather than the standard 120 minutes.

Awards Won:

Fourth Award of $500