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The Chemistry of Customer Attention

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APPLICATION NOTES

UV Curable Scratch-Off Coatings

SCREEN

UV scratch-offs are best applied via flat bed or rotary screen. As a starting point, a 215 mesh for rotary screen is recommended for adequate coverage, typically 0.5-0.6 mil coating thickness. For flat bed screen applications, a 230 mesh is recommended. This should yield a coating thickness of about 0.6 mil.

FLEXO

In order to ensure proper transfer of the scratch-off to the paper, you will need to make sure that your anilox roller is configured as follows:

The cell volume needs to be about 15 billion cubic microns/square inch. This should allow you to put down approximately 0.5 mil of coating. Please keep in mind that these numbers may need to be increased if the message is difficult to hide. For most applications, AT LEAST 0.5 mil of scratch-off is needed for adequate hiding. Cell openings themselves should be at least 70-75 microns wide. Cell openings that are too small will not pick up enough silver. Wide shallow cells are better than narrow deep cells. Line screens of about 100 lines/inch are recommended. As an alternative, this coating weight may be applied in multiple steps/layers in order to achieve hiding.

FOR ALL CASES

Message requirements: The printed message should be screened down significantly. We specify that most messages will need to be screened down with a 30% screen, you may have to go to a 10% screen if the message is difficult to hide due to its design or pattern and/or scratch-off color chosen. Shapes and letters that are both bold (dark) and large will be difficult to hide regardless of how much coating is applied. In general, this is true of all scratch-offs, not just UV. When dealing with conventional inks, high-density prints can also cause poor adhesion of the release coating.

Release Coating: The UV scratch-offs MUST be applied over a UV release coating that has already been properly cured. Without the release coat, the UV scratch-off will stain or smudge when scratched. For coated substrates or ones that are not very porous, we recommend using either 1035D or 1035PBN, UV coating, for good release. The release coating is typically applied at 0.2-0.3 mils (approximately 360 lines per inch and 4-6 bcm). At these coating weights, a single 400 watts/inch lamp will cure at 400 feet/minute, assuming it is not soaking into the paper. For porous stocks where soak through is common, consult the Technical department. A higher viscosity product will be required depending on the type of paper.

Curing Scratch-Off: At the 0.5-0.6 mils coating weight, a single UV light (H bulb recommended) operating at approximately 600 watts/inch should be able to fully cure the coating at a line speed of around 400 feet /minute depending on coat weight deposited. Combinations of lights can be used as well, and many such systems typically have 3 or 4 lights in succession generally operating at 300 or 400 watts/inch for each light. If multiple lights are available, a D bulb (or iron-doped) could provide longer wavelength penetration for through cure. These products are formulated with various photoinitiators and cover a wide variety of spectral outputs in order to optimize curing. **200 watts/inch lamps are not suggested.** They cannot penetrate through the pigment and do not allow for sufficient through cure. Line speeds for these multiple lamp arrangements can run anywhere from 50 feet/minute to 400 feet/minute. Line speeds and light intensity data will vary depending on how much coating is actually applied to the paper. Again, the numbers stated here assume that 0.5-0.6 mils of scratch-off will be applied.

Be careful not to overcure the scratch-off. We only want the coating to be completely dry and smudge-proof, not excessively brittle. At a low coat weight, overcuring can lead to little or no release when the coating is scratched. This is due to the scratch-off being impenetrable because it is too hard.

STABILITY

UV curable scratch-offs are especially susceptible to early polymerization when subjected to warm temperatures (i.e. above 90°F). It is important to shelf life and stability to store these products in a controlled environment. Guaranteed shelf life is only two months in **closed** container.

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