COATINGS & ADHESIVES CORPORATION

Matte UV Coating - Particle Concentration v1.1

Matte UV coating products are formulated using matting particles/flattening agents added to a gloss UV coating base to create a visual and measurable matte finish to the applied coating film. When the base coating and matting particles are consumed at the same rate during coating application, the results are homogenous for coating viscosity and visual/measurable gloss level during the consumption of the entire coating container. However, if the consumption of the base coating and matting particles are not at the same rate, the result can become a disproportionate amount of matting particles concentrated in the base coating within the coating container which can contribute to problems such as elevated viscosity and lower visual/measurable gloss of the applied coating film as the coating container is consumed. Elevated viscosity due to matting particle concentration can result in pumping/flow issues through the coating circuit, excessive foaming and chamber starvation. Additionally, the increased matting particle concentration in the coating container can result in the applied coating film exhibiting lower visual/measurable gloss compared to previously coated sheets from the same container creating gloss variation across a common job or multiple jobs.

Matte UV Coating Usage

Anilox Recommendation - Engraving	Open-cell engraving types such as tri-helical, channel-wave and reverse/pins-up are recommended for use with matte UV coating as they allow the matting particles to move freely into the cell cavity for transfer to the coating blanket/plate. Closed-cell engraving types such as hexagonal or elongate hexagonal can impair the ability for the matting particles to enter the cell cavity for transfer to the coating blanket/plate. When using a closed-cell engraving, a larger cell volume/engraving may be necessary to ensure a sufficient transfer rate of the matting particles to avoid un-proportional consumption of the base coating and matting particles which can lead to matting particle concentration in the coating container.
Anilox Recommendation - Volume	In order to ensure a consistent consumption rate of both base coating and matting particles, the appropriate anilox volume should be used to ensure successful results. An insufficient anilox volume, particularly when using a closed-cell engraving, can result in the base coating being consumed at a higher rate than the matting particles contributing to matting particle concentration as the coating container is consumed. An anilox volume of 12-14 bcm is recommended for use with matte UV coating products for best results. When using an open-cell engraving, a lower volume anilox in this range is typically sufficient for transferring the matting particles. When using a closed-cell anilox engraving, a higher volume anilox in this range is preferable.
Multiple Roller/Nip Application Systems	When using coating systems that utilize a metering nip for coating transfer, the metering/nip adjustment/setting must be appropriate to allow the matting particles to transfer through to the coating blanket/plate. If the metering/nip adjustment/setting is too tight, the matting particles may not transfer consistently through to the coating blanket/plate. In this case, the base coating and matting particles will not be consumed at the same rate resulting in matting particle concentration in the coating container. Additionally, the applied coating film may not exhibit the intended characteristics for visual and measurable gloss as the applied coating film may be starved for matting particles resulting in a glossier than desired film.
Initial Mixing, Pre-Production	Over-time, the matting particles in the coating container can separate and settle to the bottom of the coating container. Prior to using any matte coating product, the coating product should be mixed thoroughly in the coating container prior to checking viscosity and circulation for use. Initial mixing should be thorough to achieve a homogenous product in the container. The use of a drum-mixer or drill with mixing-blade attachment that extends to the bottom of the coating container is recommended.

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Matte UV Coating Usage - *continued*

Production Agitation	Matte UV coating should be agitated during use to ensure homogenous matting particle distribution and consumption. When using a mixing system that allows for constant agitation during production/use of a matte UV coating, care should be taken to not over-agitate the coating particularly as the coating container is consumed and the mixer impellers may become located near the coating surface. Un-like initial mixing prior to use, agitation during production/use does not require a high mixing speed to keep the product homogenous. In this case, a slow agitation is employed to maintain coating movement in the container which aids in the removal of entrained air that is returned from the coating unit. Air introduction into the coating during application/circulation by anilox/chambered systems and pan return drains must be managed for removal
Foaming	Due to the elevation of matte coating viscosity in the coating container caused by particle concentration in conjunction with entrained-air introduction during use, problems such as impaired pumping/flow through the coating circuit and chamber starvation can occur. In this case, excessive foaming of the matte coating can cause the viscosity to increase to a degree that it becomes unusable as consistent coating pumping/flow cannot be achieved. Over-agitation due to excessive mixing speed can exacerbate the issue of foam development. Visual and measurable gloss variation can occur due to changes in applied coat-weight and/or matting particle concentration in the applied coating film. Coating containers that are determined to contain excessive entrained-air/foam contributing to pumping/flow issues should be removed from production and left un-mixed to allow the entrained-air to dissipate. Over time, the entrained-air will dissipate and the coating viscosity will become reduced.
Matting Particle - Hard Settling	Over-time the matting particles can separate from the gloss base coating and settle at the bottom of the coating container. Typically, thorough initial mixing prior to use can re-distribute the matting particles throughout the coating container and blend them into a homogenous mixture with the base coating for use. In cases where 'hard-settling' occurs, the matting particles can settle into a concentrated non-miscible solid at the bottom of the coating container that cannot be mixed and re-distributed though-out the base coating. Use of coating that has hard-settled can result in a higher than desired visual and measurable gloss of the applied coating film as the coating does not contain the intended concentration of matting particles. Additional problems of coating pump/circuit contamination/clogging can occur if a large congealed piece of matting particles is sucked into the coating intake tube.
Matte UV Coating - Gloss Variation	Visual and measurable gloss of an applied matte UV coating film can vary due to changes in the film thickness, contained matting particle concentration, film smoothness and film defects such as voids/pin-holes caused by entrained-air. Due to these process variables, variations in gloss can be experienced during a single job when consuming a common coating container where the graphics, inks, and substrate remain constant. Conditional changes of the coating in the coating container for matting particle proportion/concentration, viscosity and entrained-air/foaming can all contribute to gloss variation on the printed/coated sheet. As a general-rule, a measurable variation of +/- 5 gloss units can be experienced from a single matte coating container on a job with all other variables remaining constant. In cases where matting particle concentration occurs during use, hard-settling has occurred in the coating container, coating viscosity has increased or entrained-air/foaming has occurred, one or more of these variable can contribute to a measurable gloss increase or decrease beyond 5 gloss units.

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