



Over Print Varnish Performance Program Report



| Supplier Information | |
|----------------------|--|
| Supplier Name | Michelman Inc. |
| Supplier Address | 9080 Shell Rd. Cincinnati, OH 45236 USA |

| Product Information | |
|------------------------|------------------------------------|
| OPV Name | DigiGuard UV Water Resistant Gloss |
| Manufacturing Facility | USA |
| OPV Type | UV Curable |
| Coating Finish | Gloss |
| Substrate Application | BOPP |
| Press | ws-6000 Digital Press |
| Ink Type | HP ElectroInk 4.5 |

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|-----------------------|---|
| Coating Device | AB Graphics Omega Digicoat |
| Date of Evaluation | 08/18/2016 |
| Anilox Roller | 360 Line Screen, 7BCM, 10.85 cm ³ /m ² 60 Deg ART Engraving |
| Corona Intensity (kW) | 0.84 |
| Dryer Temp (F/C) | N/A |
| UV Intensity | Set Point 45% (UV GEW VPC 35 412 W / in ² @ 100%) |
| Coating Speed | 15.24 (m/min) 50 (ft/min) |
| Evaluation Process | Full Baseline |

| Evaluation | Measurement | Result | Grade (stars) |
|--------------------|---|------------------|---------------|
| Adhesion | Tape pull test | Best Performance | ☆☆☆ |
| Mechanical Wear | Resistance to peeling, scuffing, abrasion, creasing, bending, cross cut | Good Performance | ☆☆ |
| Solvent Resistance | Resistance to water, IPA, ISOPAR | Good Performance | ☆☆ |
| Optical | Gloss, density, whiteness, shade | Best Performance | ☆☆☆ |
| Heat Resistance | Heat seal, aging, sterilization, microwave, hot surface | | |
| Sunlight Exposure | Color change, ΔE_{00} | | |

Comment Detail:

| | ★★★★ | ★★★ | ★ |
|----------------------------------|----------------------------|------------------------------|--------------------------------|
| Evaluation | Best Performance | Good Performance | Limited Performance |
| Mechanical Wear | All evaluations acceptable | 4 evaluations acceptable | < 4 evaluations acceptable |
| Solvent Resistance | All evaluations acceptable | 2 evaluations acceptable | < 2 evaluations acceptable |
| Optical Tests | No color changes/yellowing | Mild color changes/yellowing | Visual color changes/yellowing |
| Heat Resistance | 5-6 evaluations acceptable | 3-4 evaluations acceptable | 1-2 evaluations acceptable |
| Aging / Sunlight Exposure | 0-2 ΔE_{00} | 3-4 ΔE_{00} | >4 ΔE_{00} |

Star Rating

- ★★★★ Best performance: acceptable results on all conditions evaluated.
- ★★★ Good Performance: acceptable results on many of the conditions evaluated.
- ★ Limited Performance: acceptable results on some of the conditions evaluated.

The OPV tested was applied to an HP Indigo certified substrate for the HP Indigo ws6000 Digital Press. Test results correlate solely to the listed substrate and may not reflect similar performance on other certified or in-house control substrates.

Please contact the coating supplier to discuss the full detailed report if required.