



Commercial Substrate Evaluation Report

Certified for
HP Indigo

| Supplier Information | |
|----------------------|-------------------------------------------|
| Supplier Name | HANSOL AMERICA |
| Supplier Address | 400 KELBY ST, FORT LEE, NEW JERSEY, 07024 |
| Supplier Country | USA |

| Product Information | | | |
|-----------------------------------|---------------|-----------------------------|-------------|
| Product Name | TITAN ART ECO | | |
| Product Category | Paper | | |
| Grammage (gsm) / Basis weight (#) | 90 gsm/60# | Thickness (microns/caliper) | 72 um/3 Pts |

| | | | |
|----------------------|------------------------------------------------------------------------|----------------------|---------|
| Certification Number | RI5500-15-4165 | Certification Center | RIT |
| Date of Evaluation | 08/26/2015 | Evaluated on | HP 5500 |
| Certified for | 5500, 3050/3500, 5000, 5600 multi-shot, 7000, 7500, 7600, 7800 & 10000 | | |
| Evaluation Process | Full | | |

| Evaluation | Measurement | Result | Grade (stars) | Comments |
|------------------------------|---------------------------------------|--------|---------------|----------|
| Runability | | | | |
| Simplex | Number of Jams | 0 | ★ ★ ★ | |
| Duplex | Number of Jams | 0 | | |
| Ink Adhesion / Fixing | | | ★ ★ ★ | |
| Peeling | 100%K in 4 color mode, % in remaining | 92% | ★ ★ ★ | |
| Flaking | <1mm, % Coverage | 350% | | |
| Photo Peeling | 290K in 4 color mode, % in remaining | 95% | | |
| Photo Flaking | <1mm, % Coverage | 350% | | |
| Photo Recommended | >80% after 10 or 60 min | Yes | | |
| White Ink Recommended | >80% after 10 or 60 min | N/A | | |
| Blanket Compatibility | | | | |
| Cleaner Pages | 1st clean page after 12K impressions | 1 | ★ ★ | |
| Evaluation Result | | Pass | | |

Comment Detail: Gloss Memory - Substrate received a two star rating for a slight amount of gloss memory.

The substrate certification procedure incorporates several processes.

An initial screening evaluation is followed by a more comprehensive evaluation

looking at the performance of the particular substrate within the press. This checks for:

Runnability:

The ability of the substrate to run smoothly through the press in various print modes.

Fixing:

Ink-substrate interaction as determined by: 1) The degree of ink adhesion to the substrate for standard and photo-related applications as measured in a tape peel test of the image; and 2) The degree of flaking of the ink layer. The fixing properties are measured through a range of blanket temperatures and pressures.

Blanket Compatibility:

Blanket-substrate interaction as determined by: 1) Ink-transferability, which is the quality of ink transfer from the blanket to the substrate as reflected in highlight dots, thin lines, heavy images and image edge integrity; 2) 'Blanket Memory' effects, reflected in gloss or density differences between solids and background areas of the previously printed image; and 3) Number of cleaner pages, in which blankets are routinely maintained by performing a self cleaning procedure ("cleaner pages") used to refresh the blanket's release layer.

Photo and White Ink Applications:

Use of robust media products is strongly recommended when printing photo-related and/or white ink applications and/or Light Cyan and Light Magenta due to additional ink coverage demands of these applications. This media has been tested and approved to perform well with higher levels of ink coverage, and is therefore recommended for photo-related and/or white ink type applications. However, it is strongly recommended that user acceptance ultimately be evaluated per individual application and finishing requirements, etc. The test results are provided as a guide; assess actual performance to determine suitability for individual use.

Star Rating

- ★★★★ Best performing substrate: fewer print cleaners needed; no blanket memories at least up to 12K impressions.
- ★★★ Recommended substrate: some print cleaners may be needed; slight memories may be seen up to 12K impression
- ★ Good substrate: print cleaners generally required; some memories may be seen by 12K impressions.

| | | ★★★★ | ★★★ | ★ | |
|-----------------------|-----------------------------------------------------|----------------------------------------------------|---------------------------------------------------------|-----------------------------------------------------------|-----------------------------------------------------|
| Evaluation | Measurement | Best-performing | Recommended | Good | Failure |
| Transport | Runnability | No jams with the tested paper | No more than 1 jam or minor issue with the tested paper | No more than 1 jam and minor issues with the tested paper | 2 jams with the tested paper, control performs well |
| Fixing | Peeling | All 4 results are ≥ 90% | All 4 results are ≥ 80% | At least 1 result is ≥ 80% | All results < 80% |
| | Flaking Guillotine, 5min • Coated | All results are > 250% | At least 1 result is > 250% | At least 1 result is > 200% | Results < 200% |
| | Flaking Guillotine, 5min • Uncoated | Result is > 300% | Result is > 250% | Result is > 200% | Results < 200% |
| Photo | Peeling 290% Black | Result is > 80% after 10 or 60 minutes | | N/A | Results < 80% |
| | Flaking Guillotine, 5min | <1mm at 350% K | | N/A | Results > 1mm |
| Blanket Compatibility | Cleaner Sheets | 1 st Red is clean | 3 rd Red is clean | 5 th Red is clean | 5 th Red not clean, or White observed |
| | Monitors on tested paper and reference glossy paper | Very minor memories at least up to 12K impressions | Slight memories may be seen up to 12K impressions | Some memories may be seen by 12K impressions | Severe lack of dots/cracks/gloss memory |

This substrate is certified for the next two years from the date of evaluation, provided there is no change to the paper properties or production processes. At the end of two years from the original evaluation date, if there have been no changes in paper properties or production processes, the certification can be extended for another two years. After four years from the original certification date, a new certification is required.



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