CustomTest Report

A Comprehensive Keypoint Intelligence Field Evaluation

Roland DG TrueVIS VG2-640/540

Eight Color (CMYKLcLmLkOr) Eco-Solvent Wide Format Printer/ Cutter with Orange Ink

8 Color : CMYKLcLmLk Orange

★★★★☆
Image Quality

Halftone Images	★★★★☆
Color Gamut	★★★★★
Color Accuracy	★★★★☆
Multi-Panel Wallpaper Consistency	★★★★★

★★★★☆
Usability

★★★★☆
Speed

OUR TAKE

Featuring Roland's new TR2 eco-solvent inkset that now includes orange, a first for the company in its eco-solvent device portfolio, the eight-color Roland TrueVIS VG2-540 wide format printer performed superbly in Buyers Lab's evaluation. Testing revealed that image quality was enhanced significantly by the addition of the orange ink, with the VG2-540 reproducing many hard-to-match colors in our corporate color accuracy test extremely well. The unit earned a top score in the color gamut category for not only delivering gamut volumes among the largest measured, but it also holds the rare distinction of exceeding the Adobe RGB color space in the orange region of the spectrum, sure to be valued by color critical print shops. A majority of halftone images were consistently deemed vibrant with very good contrast and details, earning high marks all around. In our multi-panel wallpaper consistency test, the VG2-540 produced panels with near-perfect dimensional stability and color accuracy, assuring that output for side-by side display will always be spot on. In the usability category, Roland has made several noteworthy improvements to the VG2-540 over the VG-series. Two that BLI most appreciates are the newly-designed media edge clamps and center pinch rollers that no longer have to be removed when a sheet cut or contour cut is initiated, a definite productivity booster. The upgraded complimentary VersaWorks 6 RIP, which continues to offer intuitive operation for all large format print and cut tasks, now features five queues instead of two, so operators can create even more time-saving workflow presets. Designed for a wide varitey of large format print applications the Roland TrueVIS VG2-540 with orange ink comes highly recommended by Buyers Lab.

JULY 2019

BENEFITS

- Exceptional PANTONE color matching capabilities ensures precise production of hard-to-match colors
- Roland Color System Library offers an additional 130 spot colors comprising orange ink for the most accurate color matching
- Straightforward print job submission, job monitoring and color editing via complimentary Roland VersaWorks 6 RIP; five preset queues enhance workflow
- Environmentally friendly 500-ml. ink pouch replacement system eliminates plastic cartridge disposal and waste
- Large waste ink tank requires less frequent removal
- Unattended printng facilitated by new TU4 roll take-up system
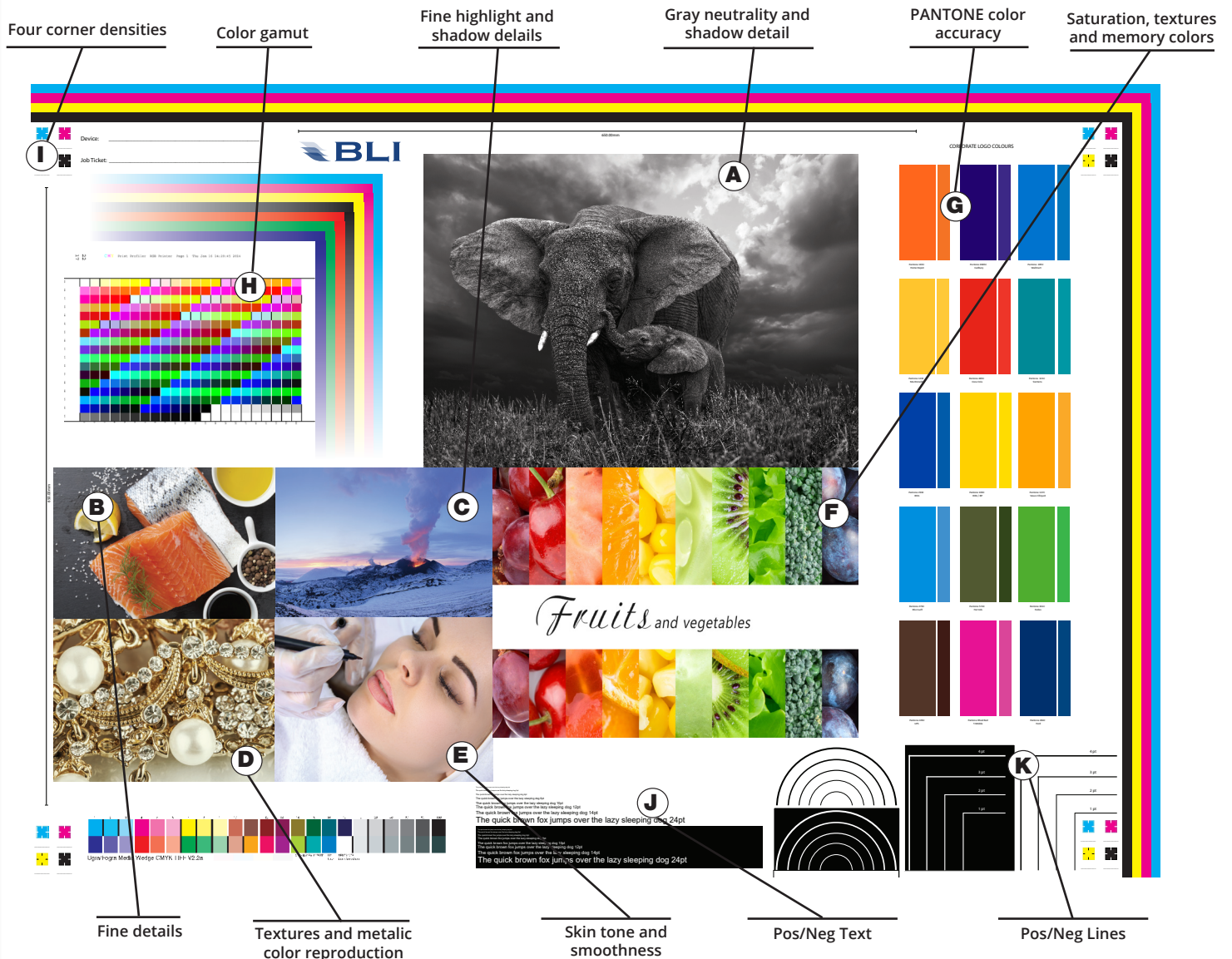
ADVANTAGES

- A majority of halftone images exhibit smooth appearance with very good contrast and fine details
- Exceptional dimensional stability leads to highly accurate multi-panel printing
- Extended color gamut volume assures production of a wide range of colors
- Remote access via Mobile Panel app on Android or iOS devices for easy monitoring and conducting maintenance tasks
- Remaining media length counted down; "print memo" length-tracking capability
- Integrated automatic cutter with redesigned edge clamps and center pinch rollers for increased productivity

IMAGE QUALITY   ★★★★☆

- Among the printer's many strengths is the above average image quality produced by the TrueVIS VG2-540 with Roland's new TR2 inkset that includes orange ink. A large majority of BLI's halftone images were rated either very good or excellent at each of the test conditions as seen in Table 1. These results compare very favorably against most competitive devices evaluated by BLI to date.
- The salmon image was rated "Very Good" overall and described as having very good contrast, and was smooth appearing with a neutral gray background, though overly bright.
- The volcano image garnered an "Excellent" rating at the highest quality setting and described as having a bright, photo-like, smooth appearance with very good details.

KEYPOINT INTELLIGENCE
Buyers Lab

Four corner densities

Color gamut

Fine highlight and shadow delails

Gray neutrality and shadow detail

PANTONE color accuracy

Saturation, textures and memory colors

Fine details

Textures and metalic color reproduction

Skin tone and smoothness

Pos/Neg Text

Pos/Neg Lines

- The jewelry image received an "Excellent" rating under two of the three print scenarios. It was described as having bright, 3D-like, realistic quality, and was sharp with very good contrast. Similarly, the fruit image received two of three "Excellent" ratings and exhibited very high contrast with deeper, more vibrant colors.

- The face image printed on Avery Dennison MPI 1105 media at the most productive setting was described as having excellent contrast, smoothness and fine details, and was rated "Excellent."

- The elephant target, which was rated "Good" overall was described as sharp-appearing and neutral gray, but overly dark causing a loss in shadow details.

Table 1

Images	MPI 3000: Most Productive (5 Pass)	MPI 1105: Most Productive (5 Pass)	MPI 1105: Highest Quality (13 Pass)
Elephants	Good	Good	Good
Salmon	Very Good	Very Good	Very Good
Volcano	Very Good	Very Good	Excellent
Jewelry	Excellent	Very Good	Excellent
Face	Very Good	Excellent	Very Good
Fruit	Very Good	Excellent	Excellent

Halftone image quality was assessed using BLI's proprietary A0-size wide format test target that comprises six high quality color and black and white halftone images. The target was printed at the most productive speed/quality setting that produced acceptable overall quality without visible banding on both Avery Dennison MPI 1105 and MPI 3000 media. For the Roland TrueVIS VG2-540, the high speed/5 pass setting was selected for both media, as was the "Generic Vinyl 1" profile and the "True Rich Color" Color Management RIP preset. The target was also printed on MPI 1105 media at the highest quality/13 pass setting. Each of the six images was cut from the larger target and visually appraised for color accuracy, brightness, sharpness, and contrast at a distance of ten feet for the MPI 3000 media and at a distance of two feet for the MPI 1105 media.
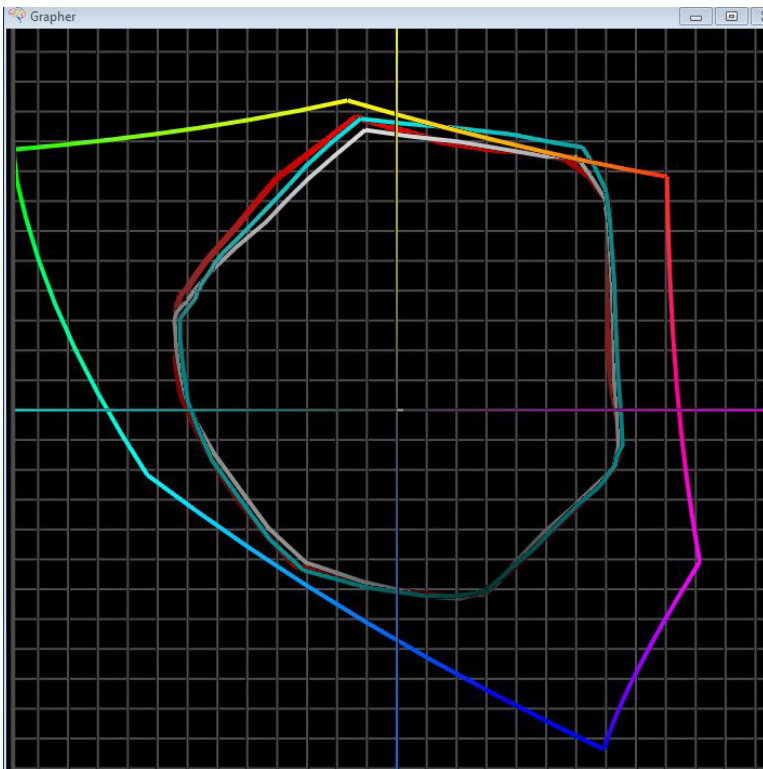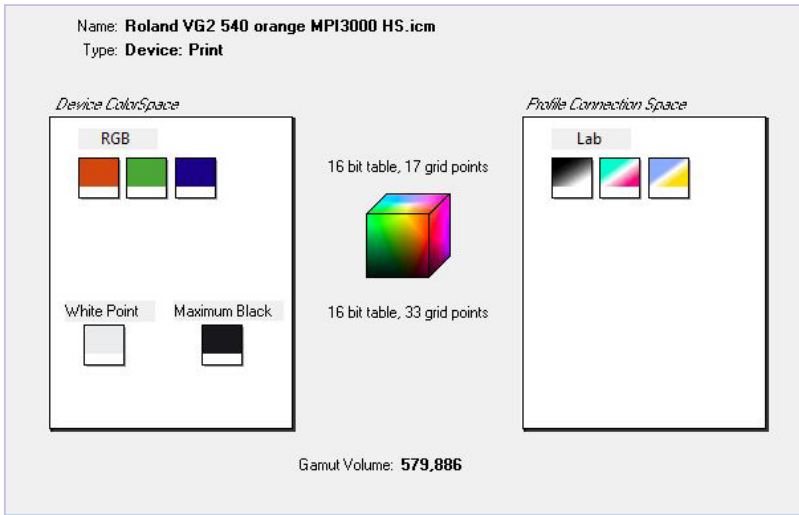
Color Gamut

★★★★★

- Under each test condition, the eight color Roland TrueVIS VG2-540 with orange ink produced a larger color gamut than most eco-solvent/latex ink devices tested to date by BLI. At the most productive 5 pass setting on MPI 3000 media, the color gamut CIE volume measured 579,886, which is 19.0 percent larger than the competitive average. On MPI1105 media at the same setting, the color gamut volume measured 609,871, which is 20.3 percent larger than the competitive average. And at the highest quality 13 pass setting, the gamut volume measured 612,369, 20.2 percent larger than average. (See Table 2)

- It is worth noting that, as seen in the color graph on the next page, for each of the three print scenarios, the Roland TrueVIS VG2-540 produced a color gamut that reached or exceeded the Adobe RGB(1998) color space in a segment of the yellow to orange region of the spectrum, a likely and advantageous result of Roland's new TrueVIS TR2 orange ink. Although BLI has recorded a few color gamut volume measurements slightly higher than those presented here, they have not reached this part of the spectrum as closely as the VG2-540 with orange ink has.

Table 2

| Media: Setting	Graphic Color Representation	VG2-640 Color Gamut (CIE Volume)	Competitive Average (CIE) Volume Of All Tested Devices	Percent Smaller/ Larger Than Competition
Avery Dennison MPI 3000: Most Productive (5 Pass)	White	579,886	487,460	+19.0
Avery Dennison MPI 1105: Most Productive (5 Pass)	Cyan	609,871	506,782	+20.3
Avery Dennison MPI 1105: Highest Quality (13 Pass)	Red	612,369	509,538	+20.2

Roland TrueVIS VG2-540 color gamut compared against Adobe RGB (1998) color space (multi-color graph)

Roland VG2-540 color gamut volume on Avery Dennison MPI 3000 at high speed/5 pass setting
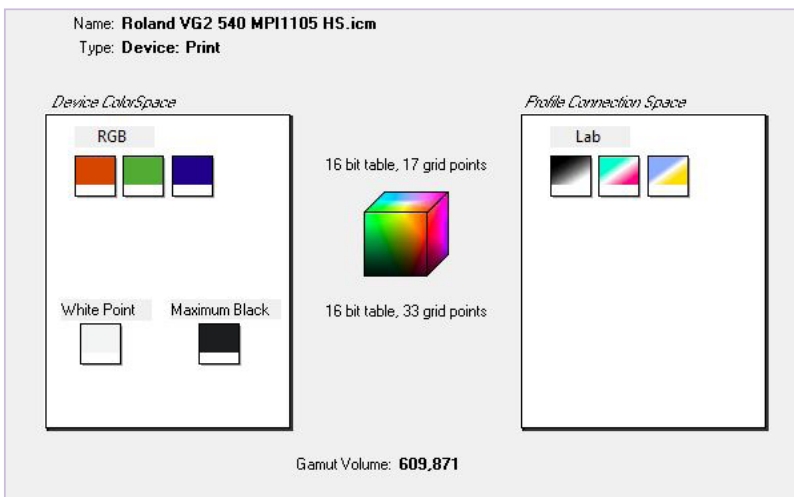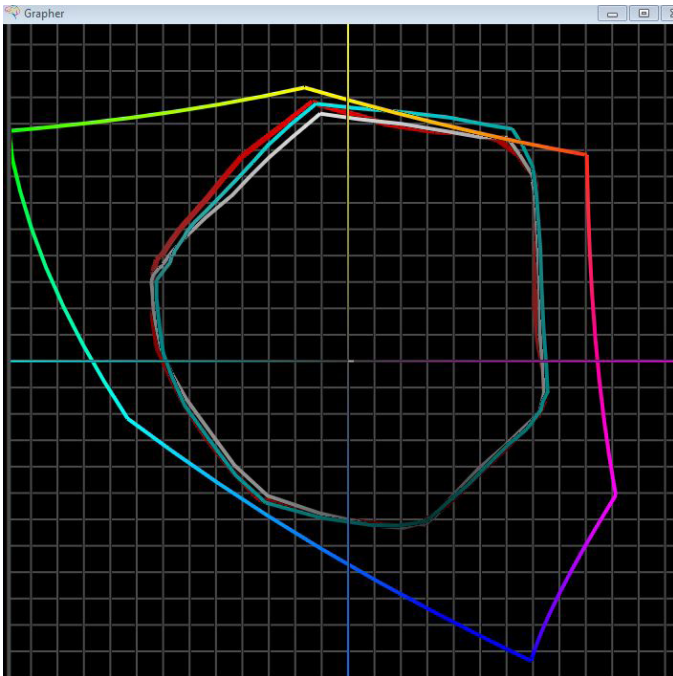

Roland VG2-540 color gamut volume on Avery Dennison MPI 1105 at high speed/5 pass setting
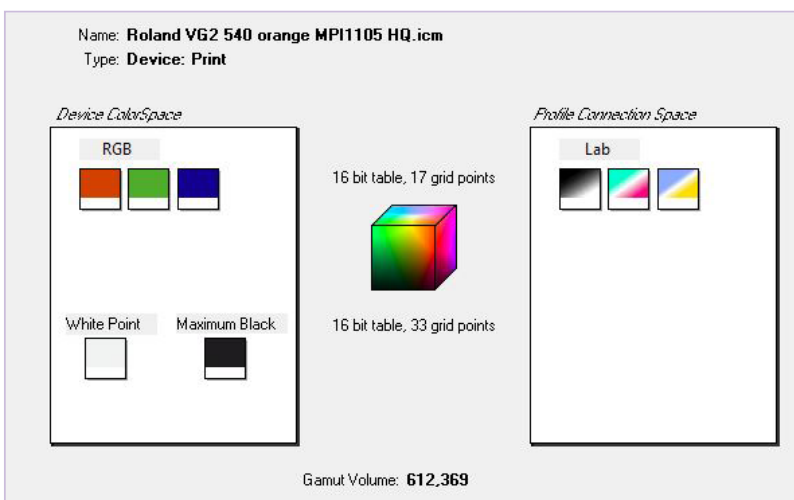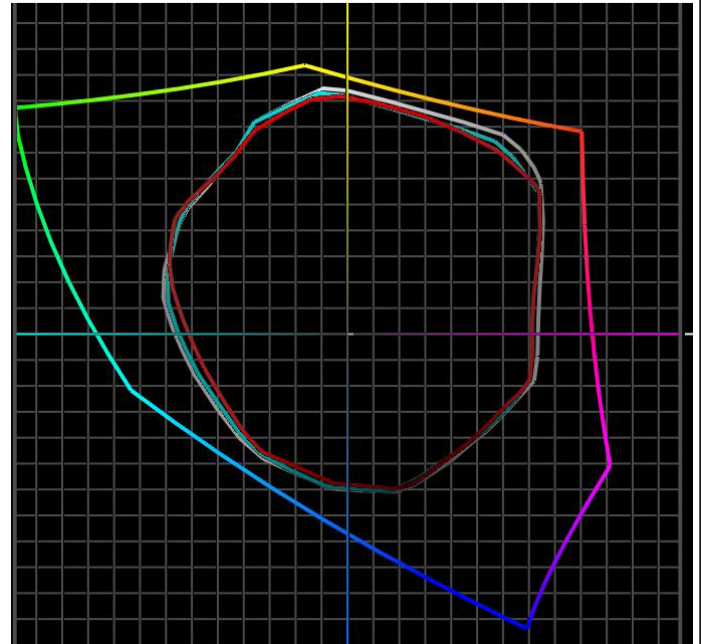

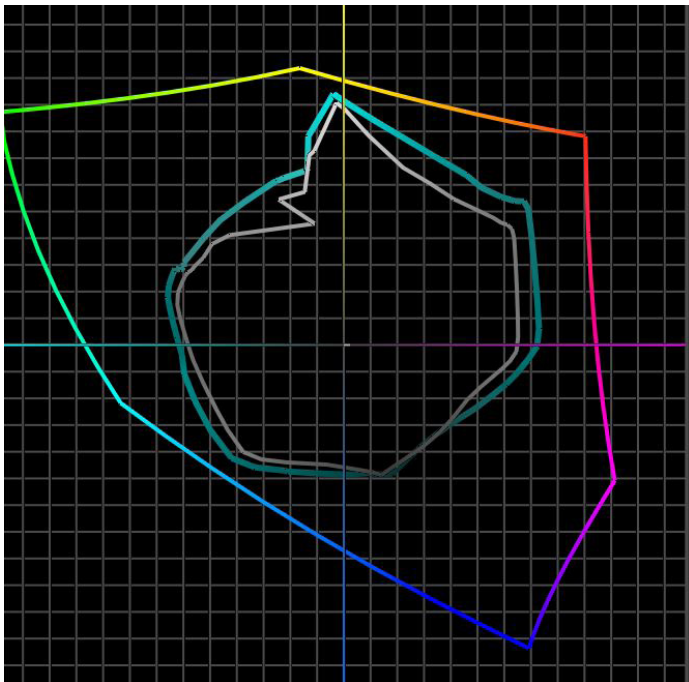Roland VG2-540 color gamut volume on Avery Dennison MPI 1105 at high quality/13 pass setting

■ For comparison purposes, the color gamut graphs for the same print scenarios for the VG2-540 with orange ink and two competitor devices that also feature orange ink are displayed below.

VG2-640 color gamut

Competitor A: device color gamut

Competitor B: device color gamut

PANTONE CORPORATE COLOR ACCURACY

★★★★⯪

- The Roland VG2-540 also produced better color accuracy on Avery Dennison MPI 1105 media versus the competitive average of BLI-tested devices to date. At the most productive high speed/5 pass setting the VG2-540 delivered a cumulative Delta E00* average of 3.35 for the 15 corporate colors, while the competitive average under the same conditions was 4.79. (See Table 3)

- In fact, the VG2-540 delivered better Delta E values for 13 of 15 colors versus the competitive average. The accuracy with which the device produced the two orange colors in BLI's test target – PANTONE 165C/ Home Depot (3.95 vs. 7.50) and PANTONE 137C/Veuve Clicquot (2.22 vs. 5.56), as well as both IKEA colors – PANTONE 293C (3.81 vs. 7.35) and PANTONE 109 C (0.70 vs. 3.52) is especially noteworthy. Furthermore, the device printed 10 of 15 colors with Delta E00 values that came in under 4.0. (See Table 3)

- Improved color accuracy was also achieved by the TrueVIS VG2-540 when printing at the high quality setting, with a cumulative average Delta E00 value of 3.03 versus an average of 4.30 for all competitive models. (See Table 4) Once again, the two orange colors, two IKEA colors, as well as several others in BLI's test target were produced more accurately when compared against the competitive averages. Here too, the Delta E00 measurements for 11 of 15 colors were less than 4.0.

Delta E is a way of showing the degree of color differences between two colors. A lower delta E value represents a better color accuracy.

Table 3		VG2-540: MPI 1105 High Speed/5 Pass Generic Vinyl 1	Competitive Average: MPI 1105 Most Productive Print Speed	Table 4		VG2-540: MPI 1105 High Quality/13 Pass Generic Vinyl 1	Competitive Average: MPI 1105 Highest Quality Print Speed
PANTONE Color		ΔE00	ΔE00	PANTONE Color		ΔE00	ΔE00
165 C	Home Depot	3.95	7.50	165 C	Home Depot	2.27	6.42
2685 C	Cadbury	7.80	8.26	2685 C	Cadbury	5.08	7.22
285 C	Walmart	4.59	4.61	285 C	Walmart	4.15	4.07
123 C	McDonalds	2.07	4.08	123 C	McDonalds	2.27	4.25
485 C	Coca Cola	4.77	2.83	485 C	Coca Cola	0.69	2.79
321 C	Siemens	2.49	4.23	321 C	Siemens	3.44	3.32
293 C	IKEA	3.81	7.35	293 C	IKEA	4.27	6.06
109 C	IKEA	0.70	3.52	109 C	IKEA	1.10	3.39
137 C	Veuve Clicquot	2.22	5.56	137 C	Veuve Clicquot	2.52	5.12
279 C	Microsoft	5.58	4.39	279 C	Microsoft	5.21	4.24
574 C	Harrods	1.32	2.43	574 C	Harrods	2.53	2.61
361 C	FedEx	1.43	2.55	361 C	FedEx	2.83	2.48
476 C	UPS	2.77	2.95	476 C	UPS	1.74	2.49
Rhod. Red C	T-Mobile	4.10	4.59	Rhod. Red C	T-Mobile	3.95	4.26
294 C	Ford	2.69	7.05	294 C	Ford	3.33	5.80
Average ΔE00		3.35	4.79	Average ΔE00		3.03	4.30

■ Even though very accurate color matching results were achieved "out of the box" by the TrueVIS VG2-540, BLI analysts were able to achieve even better color matching by associating the PANTONE colors to the Roland Color System Library within the VersaWorks 6 RIP. This is an easy and accurate, albeit manual method for even more accurate spot and PANTONE color matching. BLI first printed a color patch chart of all the colors in the Roland library, including the new orange color system library that contains about 130 colors that comprise orange ink. Using an X-rite eXact spectrophotometer, we scanned color patches from the Roland color library printouts, looking for colors that were a closer match to the PANTONE reference library within the spectrophotometer's library. BLI analysts were able to find closer matches for eight of the fifteen colors versus the "out of box" results, after which the color names from the library were substituted for the PANTONE color equivalents in VersaWorks 6. After the modifications, BLI's test chart was reprinted on MPI 1105 media, again using the Generic Vinyl 1 profile at the high speed setting, which produced appreciably lower Delta E values for eight colors as outlined in Table 5.

Table 5		VG2-540: MPI 1105 High Speed/5 Pass Generic Vinyl 1	After Adjustments In VersaWorks 6 Using Roland Color Library
PANTONE Color		ΔE00	ΔE00
165 C	Home Depot	3.95	1.73
2685 C	Cadbury	7.80	6.80
285 C	Walmart	4.59	2.46
123 C	McDonalds*	2.07	2.07
485 C	Coca Cola	4.77	2.26
321 C	Siemens*	2.49	2.49
293 C	IKEA	3.81	2.11
109 C	IKEA*	0.70	0.70
137 C	Veuve Clicquot	2.22	1.78
279 C	Microsoft	5.58	2.76
574 C	Harrods*	1.32	1.32
361 C	FedEx*	1.43	1.43
476 C	UPS*	2.77	2.77
Rhod. Red C	T-Mobile	4.10	1.57
294 C	Ford*	2.69	2.69
Average ΔE00		3.35	2.33

* A closer color match was not found for seven test target colors
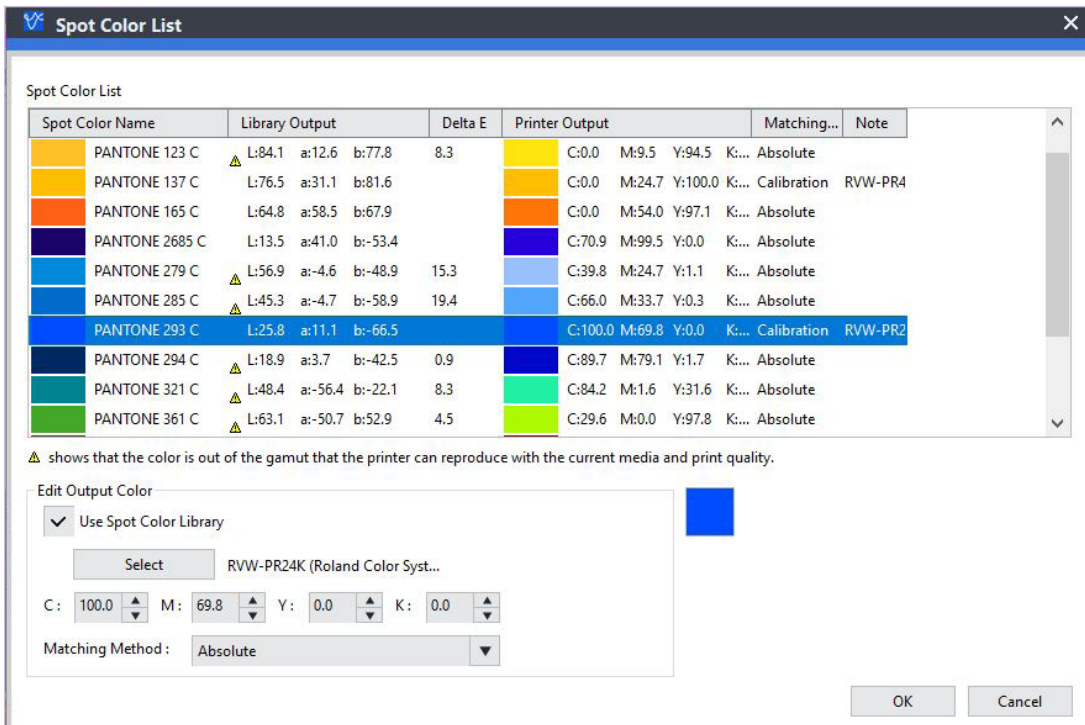
PANTONE color adjustments made in VersaWorks 6 RIP

DENSITY

- Optical density remained highly stable across the image for each color, under each test scenario. (Table 6)

- Against the competitive averages, cyan, magenta and black densities were considerably higher for the Roland VG2-540, while yellow density was marginally higher.

Table 6

MPI 3000 – High Speed/5 Pass	Top Left	Top Right	Bottom Left	Bottom Right	Maximum Density Difference	Competitive Average Density
Cyan	1.97	1.90	1.92	1.94	0.07	1.57
Magenta	1.48	1.51	1.53	1.47	0.06	1.38
Yellow	1.02	1.00	1.02	1.02	0.02	0.96
Black	2.10	2.13	2.07	2.10	0.06	1.80

| MPI 1105 – High Speed/5 Pass	Top Left	Top Right	Bottom Left	Bottom Right	Maximum Density Difference	Competitive Average Density
Cyan	2.05	2.07	2.08	2.07	0.03	1.55
Magenta	1.50	1.51	1.50	1.52	0.02	1.46
Yellow	1.01	1.01	0.99	0.99	0.02	0.96
Black	1.93	1.97	1.96	na	0.04	1.78

| MPI 1105 – High Quality/13 Pass	Top Left	Top Right	Bottom Left	Bottom Right	Maximum Density Difference	Competitive Average Density
Cyan	1.89	1.96	1.88	1.94	0.07	1.54
Magenta	1.66	1.66	1.64	1.65	0.02	1.51
Yellow	1.05	1.05	1.04	1.04	0.01	1.01
Black	1.84	1.85	1.81	1.82	0.04	1.75

COLOR CONSISTENCY – DELTA E00 ACROSS PAGE

- The VG2-540 printed BLI's three neutral color test targets uniformly with Delta E00 color variation averaging less than 0.60 for each. The average Delta E00 for each color also measured lower than the competitive average values. (Table 7)
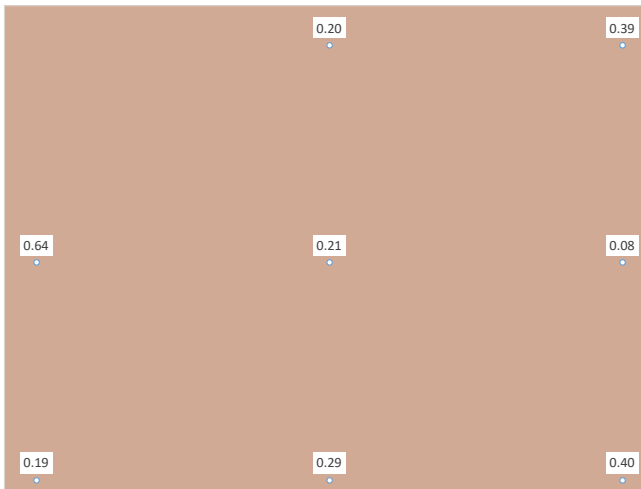
Table 7
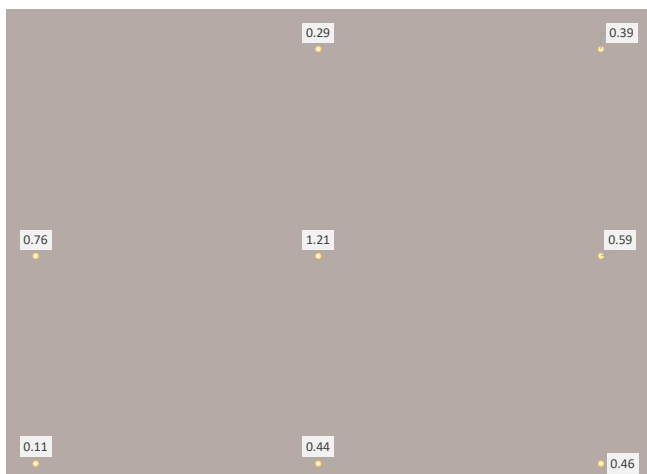
Neutral Gray
Device Average 0.53
Competitive Average 0.81
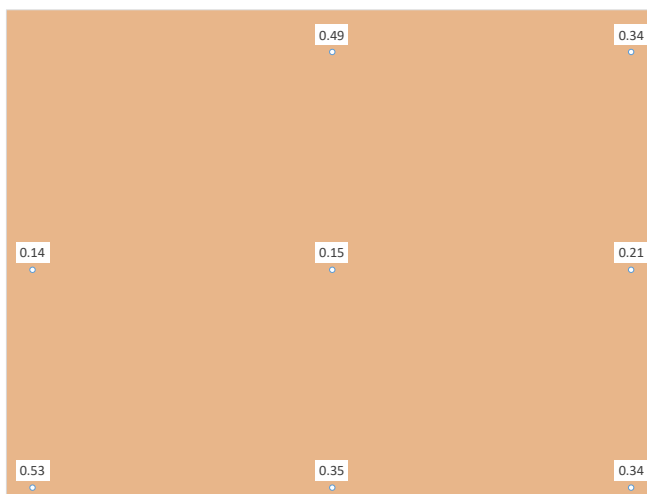
Skin Tone 1
Device Average 0.32
Competitive Average 0.83

Skin Tone 2
Device Average 0.30
Competitive Average 0.63

MULTI-PANEL WALLPAPER CHART: COLOR AND LINE CONSISTENCY

★★★★★

- In BLI's wallpaper consistency test, the Roland VG2-540 produced extremely accurate dimensional stability on Avery Dennison MPI 2105 media. As seen at the bottom of Table 8, the largest difference in one meter line length between panels measured a mere 0.38-mm in portrait orientation, and only 0.11-mm on panels that were rotated 180°.

- The maximum color variation for three neutral colors between the six panels was also quite low. In portrait orientation the maximum Delta E00 color difference between panels measured 1.25, while in rotated orientation the maximum Delta E measurement was 1.73.
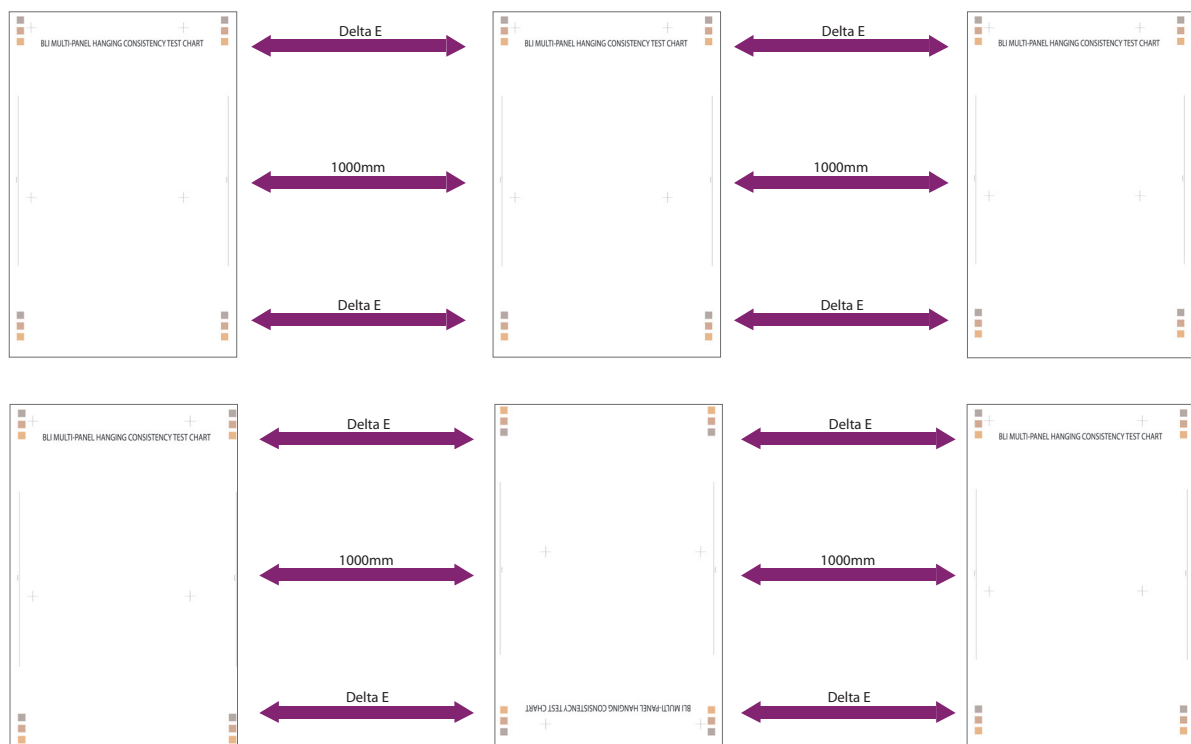
Table 8

Color	Location on Page	Maximum Delta E00 On Panels in Portrait Orientation	Maximum Delta E00 On Panels Rotated 180°
Neutral Gray	Top	1.06	1.73
	Bottom	1.25	0.67
Skin Tone 1	Top	0.54	1.23
	Bottom	0.30	0.88
Skin Tone 2	Top	0.69	0.46
	Bottom	0.51	0.46

|		
Line Measurement Accuracy – Maximum Difference Between Panels (in mm)	0.38	0.11
Line Measurement Accuracy – Competitive Average (in mm)	0.73	0.60

USABLITY   ★★★★⯪

- The VG2 series has a reduced start up process that enables the printers to begin the print process more quickly than the legacy TrueVIS devices, enhancing overall productivity.

- The tension has been improved on the TU4 media take-up unit that supplies more accurate handling of the media as it is being rolled onto a core using the new Standard setting, according to Roland.

- The VG2 series printers now feature a 2 liter waste ink tank, which is substantially larger in capacity over legacy devices' 0.50 liter tanks. It is also larger than most competitive devices' waste tanks, and will require less frequent emptying, thus providing for longer uptime.

- The sheet cutting process on the TrueVIS VG2 devices has been significantly improved in two ways and BLI believes it is now among the best available compared against devices previously tested. The edge clamps that hold the media in place during printing have been modified so that they no longer have to be removed before a sheet-cut is initiated. Operators can now set the VersaWorks 6 RIP to sheet-cut automatically once printing and contour-cut is done, after which no further intervention is required. Likewise, the center pinch rollers, which had to be removed in the past, can remain in place during printing and cutting. These improvements provide significant time savings since no user intervention is needed when a cut is made. This process is superior to some competing devices that don't offer automatic sheet-cutting, integrated contour/die-cutting function, or other devices that offer only a manual sheet-cut option. (BLI did not perform custom/contour cutting during testing.)

KEYPOINT
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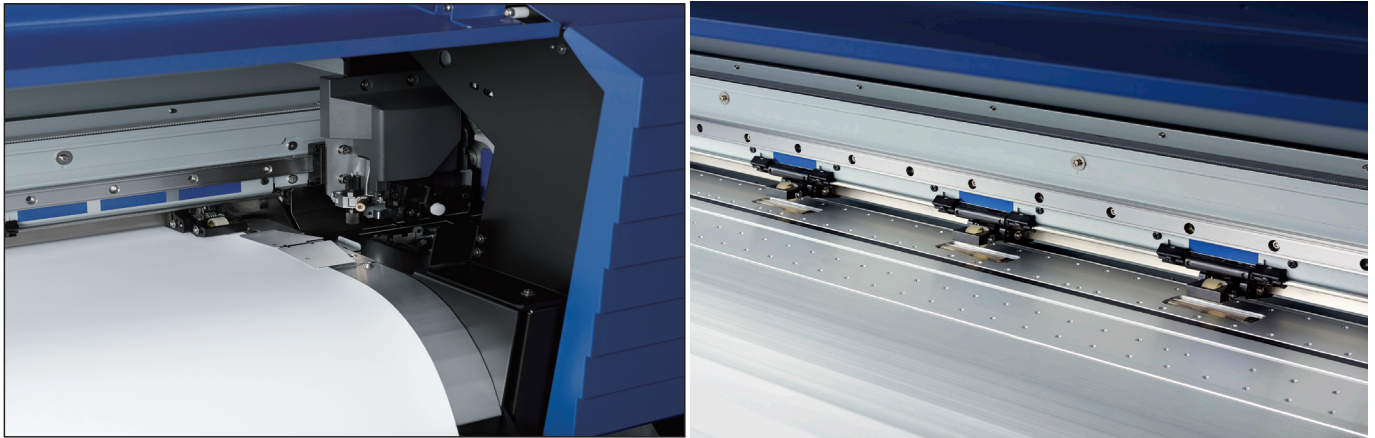
■ The Roland DG Mobile Panel app now has better connectivity, and BLI successfully utilized the app throughout the weeklong evaluation without issue. As an alternative to accessing operations at the device control panel, the mobile app provides straightforward, intuitive operation for all processes that are typically found in sub-menus at the panel.

| Printer List | Device Status | Media Settings | Media Preset |
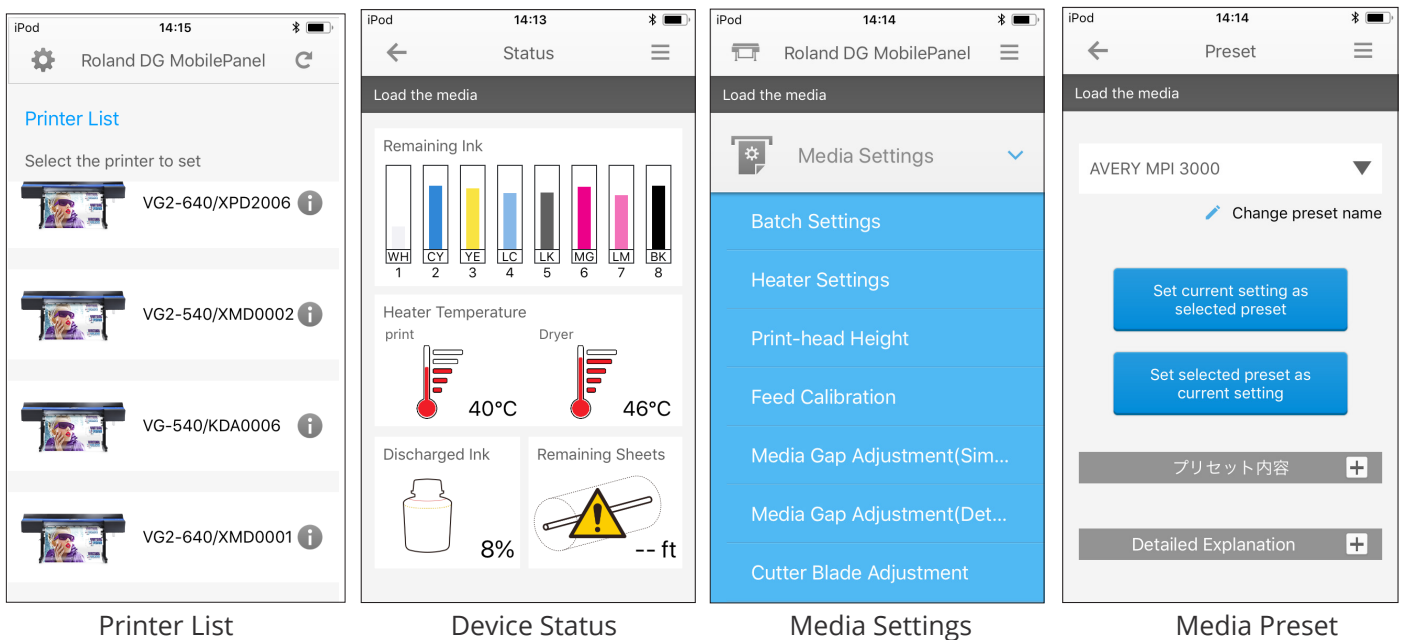
■ As a device is warming up, the Roland VG2-540 now displays the heater temperatures directly on the control panel so an operator can readily see when the device reaches operating temperature and will be ready to print.

■ The VG2-540 features three printhead height selections versus two that were available for the legacy models, enabling improved optimization of print quality.

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- A new "multi-cropmark" feature is available in the VersaWorks 6 RIP for more accurate printing and cutting alignment, even with lengthy jobs.

- Roland has incorporated an "accessory box" on top of the device, able to hold a mobile device and/or tools such as spare cutting blades or blade holders, etc.

- There are new/more input profiles available for the VG2 series of printers than there were for the legacy models. In fact, BLI utilized the new Roland-recommended "True Rich Color" input profile for all testing that provided the results outlined throughout this report.

- There are now five queues (A through E) available in the VersaWorks 6 RIP offering a greater number of configurable presets/queues vs. the two queues available in the previous RIP version.
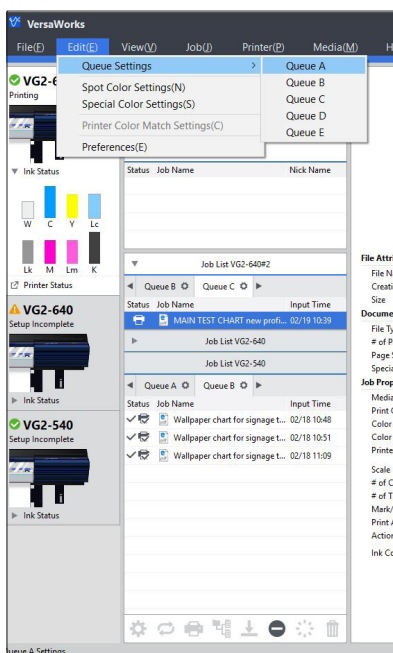
Queue Selection

SPEED ★★★★☆

- As mentioned, the Roland TrueVIS VG2-540 with orange ink was evaluated using the "Generic Vinyl 1" profile setting. The BLI-measured speeds for printing two A0-size test charts on Avery Dennison MPI 1105 and MPI 3000 at three quality settings using the Generic Vinyl 1 profile are found in Table 9.

- On MPI 1105 media at the high speed/5 pass setting, the VG2-540 delivered a print speed that is 12.6 percent faster when compared against the average for all eco-solvent/latex ink devices tested to date by BLI. (677.72 sec. vs. 775.84 sec.)

- Once again on the same media at the high quality/13 pass setting, the VG2-540 produced two A0-size prints 21.2 percent faster than all competing devices tested by BLI at the highest quality settings. (1456.19 sec. vs. 1847.94 sec.)

- On MPI 3000 media at the high speed/5 pass setting, the VG2-540 print speed for two A0-size prints was marginally below average by 0.9 percent versus competitive models. (677.91 sec. vs. 671.63 sec.)

Table 9

Avery Dennison Media	Profile/Quality Setting	Speed (sec)	Speed (sec)	Competitive Average 2 Jobs (sec)	% Faster/ Slower than Competitive Average
	Generic Vinyl 1	1 Job	2 Jobs		
MPI 1105	HS/5 Pass	335.82	677.72	775.84	+12.6%
	Std/10 Pass	554.32	1111.15	*	*
	HQ/13 Pass	733.43	1456.19	1847.94	+21.2%

Avery Dennison Media	Generic Vinyl 1	1 Job	2 Jobs	Competitive Average 2 Jobs (sec)	% Faster/ Slower than Competitive Average
MPI 3000	HS/5 Pass	335.97	677.91	671.63	-0.9%
	HS/9 Pass	482.56	974.56	*	*
	Std/10 Pass	548.03	1105.28	*	*
	HQ/13 Pass	728.82	1463.81	*	*

* Competitive averages are not calculated for these quality settings.

TEST OBJECTIVE AND SUPPORTING TEST DATA

Keypoint Intelligence - Buyers Laboratory (BLI) was commissioned by Roland DG Corporation, Hamamatsu, Japan to conduct confidential imaging device performance testing on three pre-launch Roland DG TrueVIS eco-solvent ink large format devices - the 54-inch VG2-540 eight color (CMYKLcLmLkOr) printer with orange ink, the 64-inch VG2-640 four color dual CMYK printer, and the 64-inch VG2-640 eight color (CMYKLcLmLkWh) printer with white ink. This report highlights the relative strengths and weaknesses of the eight color VG2-540 with orange ink in the areas of image quality, speed and usability and provides analyses against the competitive averages for devices previously tested by BLI. The unit was evaluated at the manufacturer's facility in Hamamatsu, Japan. 54-inch rolls of Avery Dennison MPI 1105 – polymeric cast vinyl, MPI 2105 – calendared vinyl film and MPI 3000 – monomeric calendared vinyl media were tested in each device. All test files were submitted using the VersaWorks 6 RIP provided by the manufacturer. A Roland-recommended Generic Vinyl 1 media profile was used for printing all samples, as was the "True Rich Colors" color management RIP setting.

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