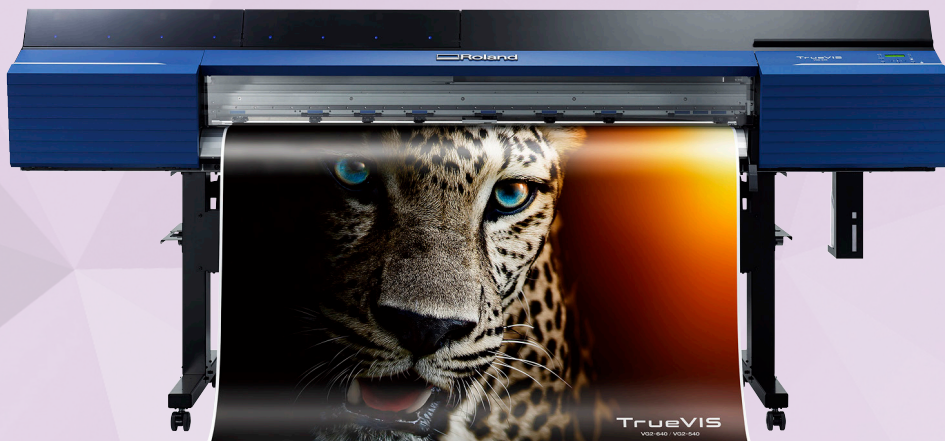# KEYPOINT INTELLIGENCE
Buyers Lab

CustomTest Report
A Comprehensive Keypoint Intelligence Field Evaluation

Roland DG TrueVIS VG2-640/540
4 Color Dual CMYK Eco-Solvent Ink Wide Format Printer/Cutter

4 Color : Dual CMYK

★★★★☆
Image Quality

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

★★★★⯪
Usability

★★★★☆
Speed

OUR TAKE

A productive choice for the creation of signs, banners, vehicle wraps, decals, labels and much more, the 64-inch Roland DG TrueVIS VG2-640 configured with dual CMYK eco-solvent inks gave a very good performance in Buyers Lab's evaluation. For the two print scenarios timed by BLI, the VG2-640 registered speeds that were between 17 and 28 percent faster than competitive averages, sure to be appreciated in busy print shops. A further enhancement to productivity, Roland has not only redesigned media clamps and pinch rollers that now provide for one-touch sheet cutting and contour cutting, but they've added a much larger waste ink tank that will require less user intervention over time. BLI continues to laud Roland's newest RIP version - VersaWorks 6 - for its overall intuitive operation. The software comes bundled with the new generation of VG2-series printers/cutters and now features five print queues, allowing operators to create even more time-saving workflow presets. The unit does not sacrifice quality for speed as most of the halftone images BLI printed were rated very good or excellent. Moreover, the printer's ability to accurately reproduce many of the corporate colors in our test files was especially noteworthy. In our multi-panel wallpaper consistency test, the VG2-640 produced panels with near-perfect dimensional stability and color accuracy, assuring seamless side-by-side display. Considering all of the model's aforementioned benefits, the dual-CMYK version of the TrueVIS VG2-640 comes highly recommended by BLI for virtually all wide format print applications.

July
2019

BENEFITS

- Above average PANTONE color matching capabilities ensures precise production of hard-to-match colors; boost color matching accuracy with Roland Color System Library

- Straightforward print job submission, mob monitoring and color editing via complimentary VersaWorks 6 RIP; five preset queues enhance workflow

- Environmentally friendly 500-ml. ink pouch replacement system eliminates plastic cartridge disposal and waste

- Time-saving ink pouch replacement on-the-fly

- Large waste ink tank requires less frequent emptying

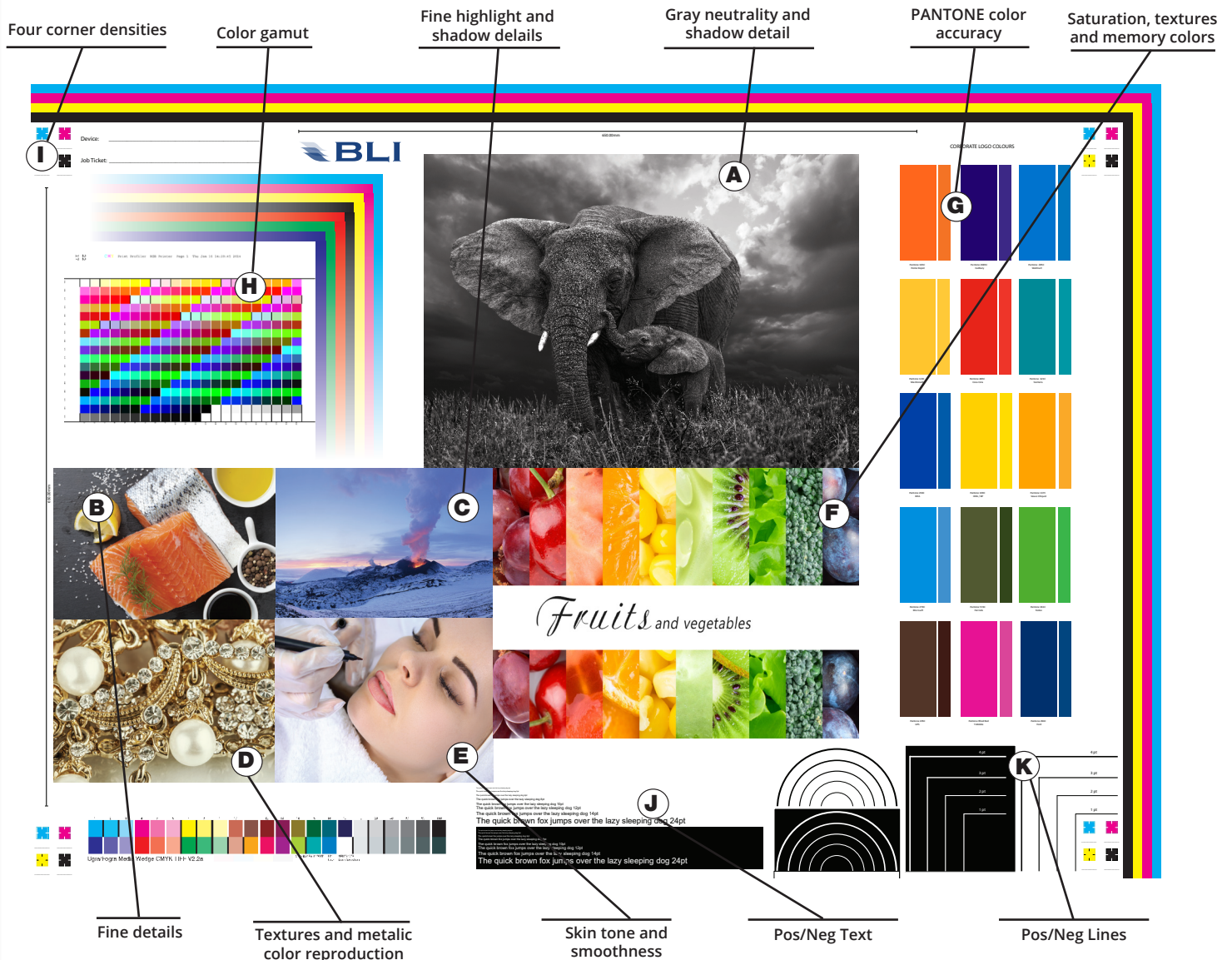- Unattended printng facilitated by new TU4 roll take-up system

ADVANTAGES

- Many halftone images are vibrant with very good contrast and overall smooth appearance

- Exceptional dimensional stability leads to highly accurate multi-panel printing

- 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 that the dual CMYK TrueVIS VG2-640 delivered. A 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 favorably against the previously-tested Roland TrueVIS VG-640 dual CMYK ink device, which had a cumulative halftone image quality score of 3.5 stars (out of 5.0). The halftone score for the TrueVIS VG2-640 is 4.0 stars.

- The salmon image was rated "Excellent" for two of three print scenarios and described as bright with high contrast, neutral gray background and very good details.

- The volcano image garnered a "Very Good" rating under each test condition and described as vibrant with photo-like appearance with very good contrast, though slightly dark overall causing loss in shadow areas.

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 bright appearing with excellent details and contrast.

- The fruit image received a "Very Good" rating under each test condition and was described as having vibrant colors with very good details and saturation.

- The face image printed on Avery Dennison MPI 1105 media at the most productive setting earned a "Very Good" rating and produced very good smoothness with high contrast, which caused a slight loss in highlight details.

- Also on MPI 1105 media at the most productive setting, the elephant image earned a "Very Good" rating as it displayed neutral gray and was sharp-appearing, though it was dark overall, which resulted in a loss of shadow details.

Table 1

Images	MPI 3000: Most Productive (4 Pass)	MPI 1105: Most Productive (4 Pass)	MPI 1105: Highest Quality (8 Pass)
Elephants	Good	Very Good	Good
Salmon	Excellent	Excellent	Very Good
Volcano	Very Good	Very Good	Very Good
Jewelry	Good	Excellent	Excellent
Face	Good	Very Good	Good
Fruit	Very Good	Very Good	Very Good

Halftone image quality was assessed using BLI's proprietary A0-size wide format test target that comprises six high quality color/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 DennsionDennison MPI 1105 and MPI 3000 media. For the Roland TrueVIS VG2-640, the high speed/4 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 8 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.
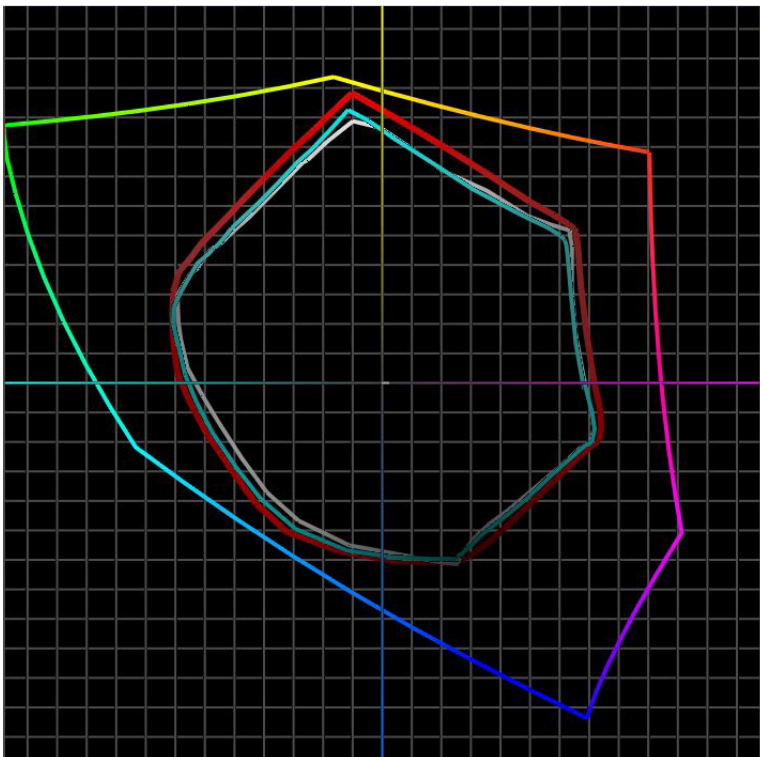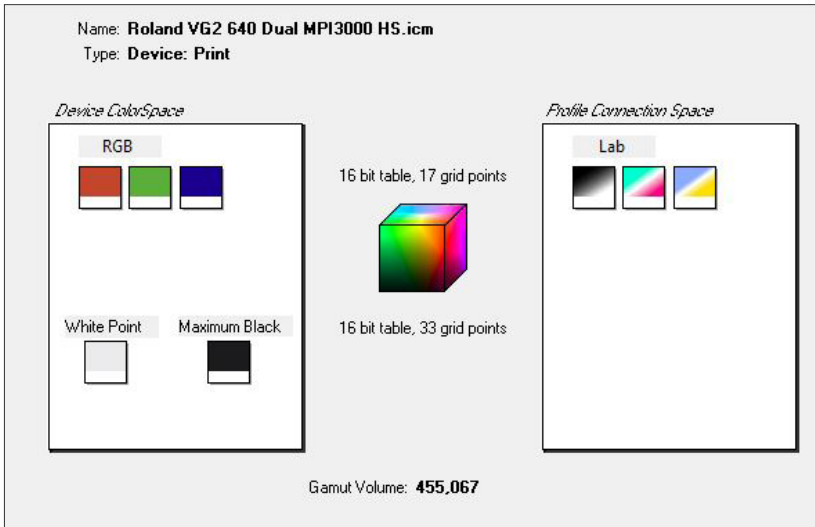
Color Gamut

★★★★☆

- The Roland VG2-640 dual CMYK ink device produced slightly smaller color gamut volumes compared against the average of all eco-solvent/latex ink devices tested to date in two of the three scenarios. At the most productive 4 pass setting on MPI 3000 media, the color gamut CIE volume measured 455,067, which is 6.6 percent smaller than the competitive average. Likewise at the most productive setting on MPI 1105 media, the device produced a 4.7 percent smaller color gamut volume than the average. However, at the highest quality setting, the Roland device's gamut was 6.0 percent larger than the average. (See Table 2)

- When compared against the dual CMYK ink Roland VG-640 that BLI previously tested, the new device's color gamut volumes were larger at each of the three print scenarios, by 7.3 percent on MPI 3000 media and by 3.8 and 62.2 percent, respectively, on MPI 1105 at the high speed and high quality settings. It should be noted that although the media used in both tests were identical, the RIP profile, color management settings and the RIP version were different, which could be cause for these variances.

Table 2

| Media: Setting	Graphic Color Representation	Roland VG2-640 Color Gamut (CIE) Volume	Competitive Average (CIE) Volume of All Tested Devices	Percent Smaller/ Larger Than Competition	Roland VG-640 Dual CMYK Ink Color Gamut (CIE Volume)	Percent Smaller/ Larger Than Roland VG-640
Avery Dennison MPI 3000: Most Productive (4 Pass)	White	455,067	487,460	-6.6%	424,296	+7.3%
Avery Dennison MPI 1105: Most Productive (4 Pass)	Cyan	482,878	506,782	-4.7%	465,315	+3.8%
Avery Dennison MPI 1105: Highest Quality (8 Pass)	Red	539,949	509,538	+6.0%	332,943	+62.2%

Roland VG2-640 color gamut compared against Adobe RGB(1998) color space (multi-color graph)

Roland VG2-640 color gamut volume on Avery Dennison MPI 3000 at high speed/4 pass setting
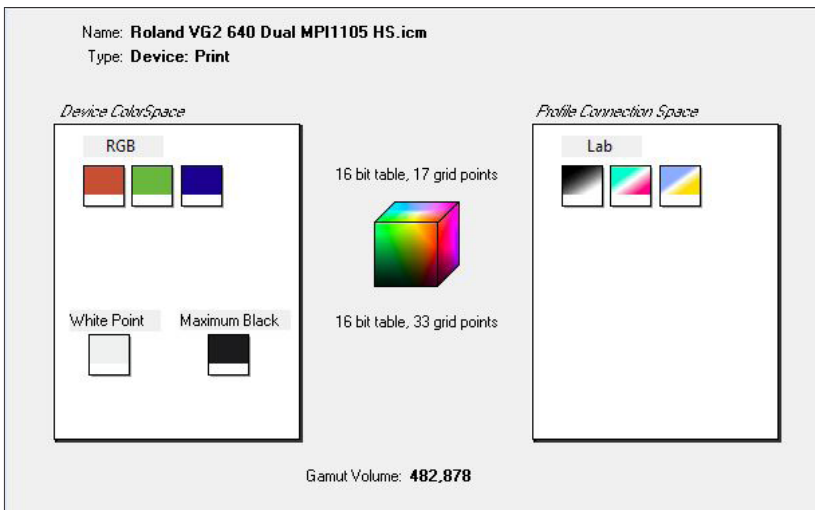
Roland VG2-640 color gamut volume on Avery Dennison MPI 1105 at high speed/4 pass setting
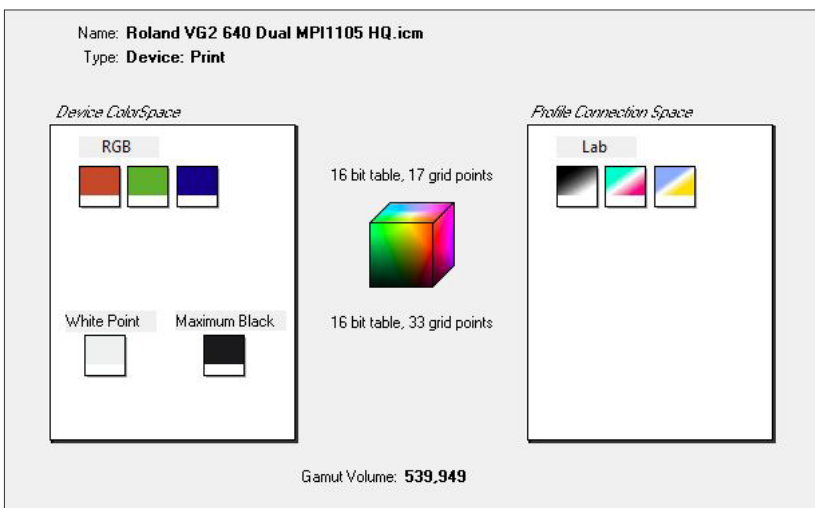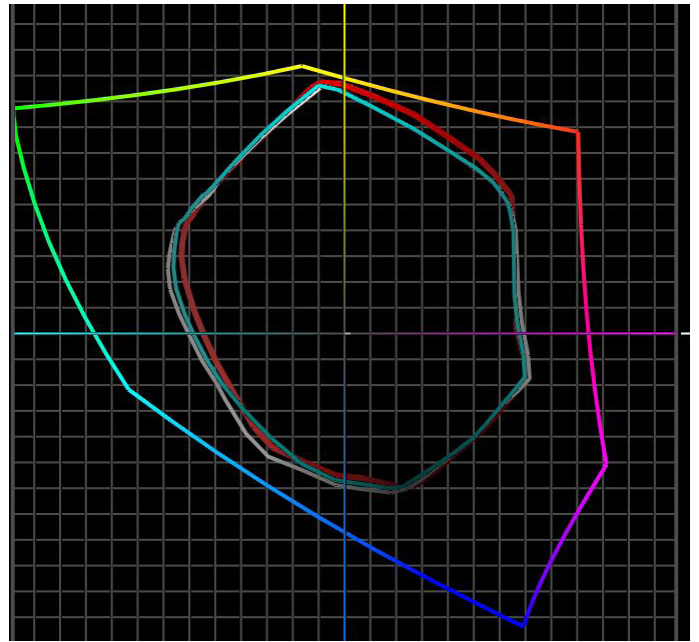

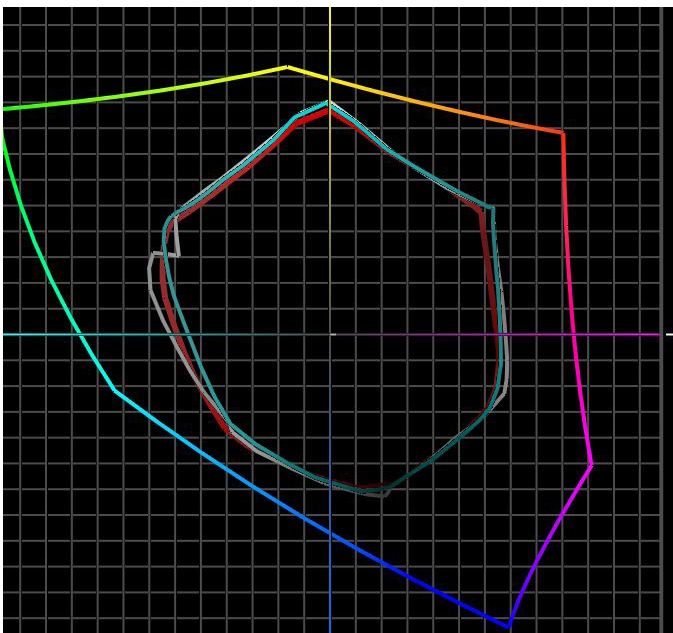Roland VG2-640 color gamut volume on Avery Dennison MPI 1105 at high quality/8 pass setting

- For comparison purposes, the color gamut graphs for the same three print scenarios for the VG2-640 and three competitor devices that employ only CMYK inks are displayed below.
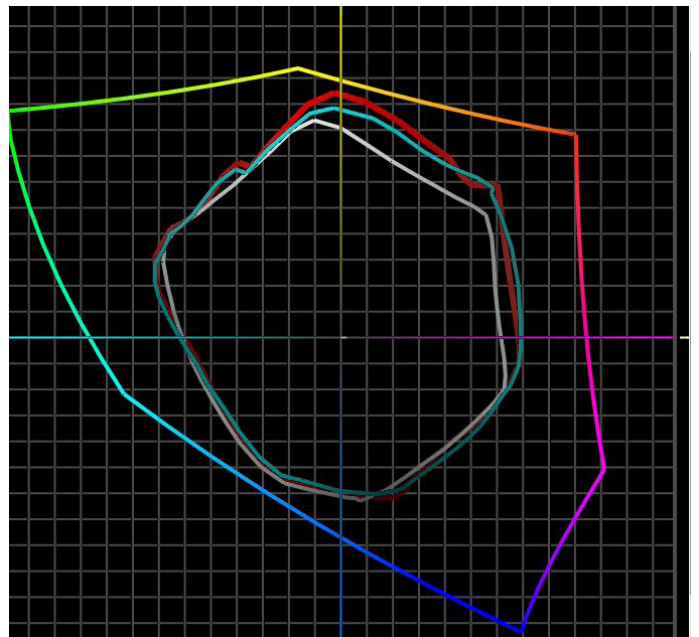

Roland VG2-640 color gamut

Competitor A: device color gamut

Competitor B: device color gamut

Competitor C: device color gamut

PANTONE CORPORATE COLOR ACCURACY

★★★★⯪

- As seen in Table 3, the Roland VG2-640 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/4 pass setting the VG2-640 delivered a cumulative Delta E00* average of 4.05 for 15 corporate colors versus a competitive average of 4.79. The VG2-640 also produced seven of 15 colors with better Delta E00 values than their competitive average.

- As seen in Table 4, the VG2-640 produced better color accuracy at the high quality setting as well, with a Delta E00 average of 3.33 versus a competitive average of 4.30. A total of 11 of 15 colors were produced with better Delta E00 values than the competitive average.

- When comparing color accuracy against the dual CMYK-ink Roland VG-640 when it was evaluated by BLI, the new device produced a lower cumulative Delta E00 average under both scenarios, with an average of 4.05 versus 4.97 at the high speed setting (Table 3). At the high quality setting the difference in color accuracy was more significant, with an average Delta E00 of 3.33 versus 5.33 for the original VG-640 device. Again, it should be noted that although the media used in both tests were identical, the RIP software versions and RIP settings were not.

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		VG2-640: MPI 1105 High Speed/4 Pass Generic Vinyl 1	Competitive Average: MPI 1105 Most Productive Print Speed	Roland VG-640 Dual CMYK	Table 4		VG2-640: MPI 1105 High Quality/8 Pass Generic Vinyl 1	Competitive Average: MPI 1105 Highest Quality Print Speed	Roland VG-640 Dual CMYK
PANTONE Color		ΔE00	ΔE00	ΔE00	PANTONE Color		ΔE00	ΔE00	ΔE00
165 C	Home Depot	4.35	7.50	5.56	165 C	Home Depot	4.41	6.42	6.68
2685 C	Cadbury	8.24	8.26	7.24	2685 C	Cadbury	5.78	7.22	5.30
285 C	Walmart	3.14	4.61	4.54	285 C	Walmart	3.92	4.07	6.52
123 C	McDonalds	6.02	4.08	4.48	123 C	McDonalds	5.28	4.25	5.20
485 C	Coca Cola	3.08	2.83	3.75	485 C	Coca Cola	1.53	2.79	5.27
321 C	Siemens	1.78	4.23	5.30	321 C	Siemens	1.54	3.32	5.68
293 C	IKEA	2.77	7.35	5.06	293 C	IKEA	2.58	6.06	4.09
109 C	IKEA	5.70	3.52	5.12	109 C	IKEA	4.18	3.39	4.67
137 C	Veuve Clicquot	6.19	5.56	5.76	137 C	Veuve Clicquot	5.09	5.12	5.18
279 C	Microsoft	2.36	4.39	6.04	279 C	Microsoft	3.79	4.24	8.18
574 C	Harrods	4.39	2.43	4.93	574 C	Harrods	2.33	2.61	4.52
361 C	FedEx	4.19	2.55	4.74	361 C	FedEx	3.04	2.48	5.79
476 C	UPS	2.94	2.95	3.38	476 C	UPS	1.77	2.49	3.68
Rhod C	T-Mobile	2.98	4.59	5.52	Rhod C	T-Mobile	3.08	4.26	5.92
294 C	Ford	2.59	7.05	3.19	294 C	Ford	1.56	5.80	3.31
Average ΔE00		4.05	4.79	4.97	Average ΔE00		3.33	4.30	5.33

■ Even though very accurate color matching results were achieved "out of the box" by the dual-CMYK ink TrueVIS VG2-640, 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 containing all of the colors in the Roland library. Then, 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 eleven 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 considerably lower Delta E values for 11 colors as outlined in Table 5.

Table 5		VG2-640: MPI 1105 High Speed/4 Pass Generic Vinyl 1	After Adjustments In VersaWorks 6 Using Roland Color Library
PANTONE Color		ΔE00	ΔE00
165 C	Home Depot*	4.35	4.35
2685 C	Cadbury*	8.24	8.24
285 C	Walmart	3.14	2.65
123 C	McDonalds	6.02	4.05
485 C	Coca Cola	3.08	1.26
321 C	Siemens	1.78	0.77
293 C	IKEA	2.77	1.16
109 C	IKEA	5.70	2.70
137 C	Veuve Clicquot*	6.19	6.19
279 C	Microsoft*	2.36	2.36
574 C	Harrods	4.39	3.52
361 C	FedEx	4.19	3.68
476 C	UPS	2.94	1.10
Rhod. Red C	T-Mobile	2.98	1.36
294 C	Ford	2.59	0.92
Average ΔE00		4.05	2.95

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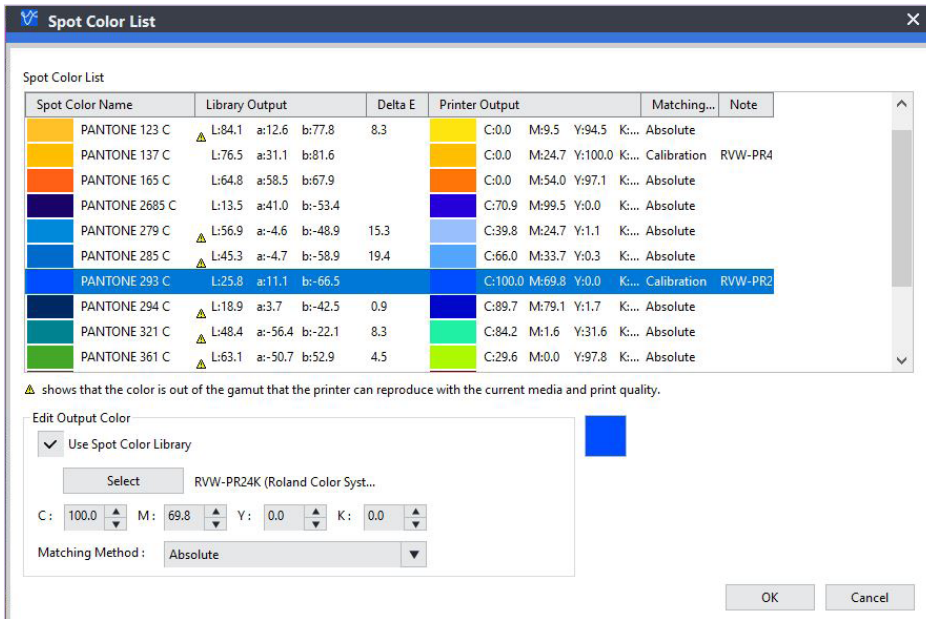
PANTONE color adjustments made in VersaWorks 6 RIP

DENSITY

■ Optical density remained highly stable across the image for each color under the three print scenarios, except for cyan on MPI 3000 media, which had a variance of 0.17 between the top left and bottom right positions on the A0-size target. (Table 6)

■ At the high speed settings on both media, cyan density was notably higher for the VG2-640 than the competitive average, while magenta and black densities were lower. Yellow density was comparable to the average on MPI 3000 media, but lower than average on MPI 1105. At the highest quality setting, the VG2-640 produced cyan and black densities that were notably higher than average, while magenta and yellow matched the averages.

Table 6

| MPI 3000 – High Speed/4 Pass	Top Left	Top Right	Bottom Left	Bottom Right	Maximum Density Difference	Competitive Average Density
Cyan	1.85	1.71	1.74	1.68	0.17	1.57
Magenta	1.27	1.25	1.26	1.25	0.02	1.38
Yellow	0.96	0.94	0.95	0.94	0.02	0.96
Black	1.73	1.71	1.75	1.72	0.04	1.80

MPI 1105 – High Speed/4 Pass	Top Left	Top Right	Bottom Left	Bottom Right	Maximum Density Difference	Competitive Average Density
Cyan	1.81	1.78	1.74	1.78	0.07	1.55
Magenta	1.24	1.25	1.23	1.24	0.02	1.46
Yellow	0.89	0.89	0.89	0.88	0.01	0.96
Black	1.76	1.72	1.72	1.70	0.06	1.78

| MPI 1105 – High Quality/8 Pass	Top Left	Top Right	Bottom Left	Bottom Right	Maximum Density Difference	Competitive Average Density
Cyan	1.87	1.88	1.87	1.94	0.07	1.54
Magenta	1.52	1.51	1.52	1.51	0.01	1.51
Yellow	1.02	1.00	1.02	1.07	0.07	1.01
Black	1.87	1.88	1.86	1.91	0.05	1.75

COLOR CONSISTENCY – DELTA E00 ACROSS PAGE

- ■ Each of BLI's three neutral color test targets were produced uniformly with Delta E00 color variation averaging less than 0.60 for each of them. The average Delta E for each color also measured lower than the competitive average values , thus the better color consistency. (Table 7)
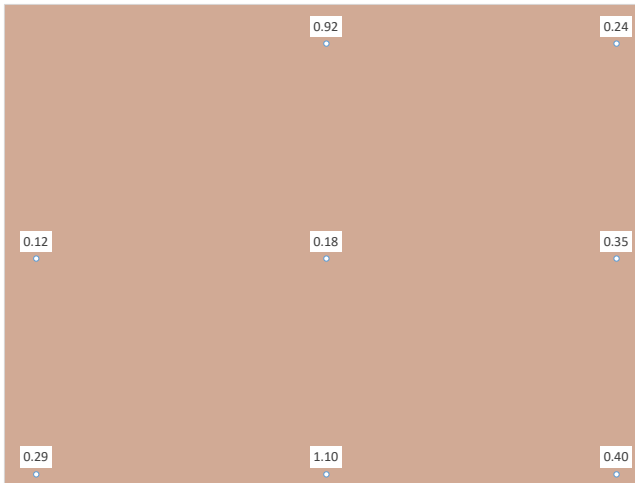
Table 7
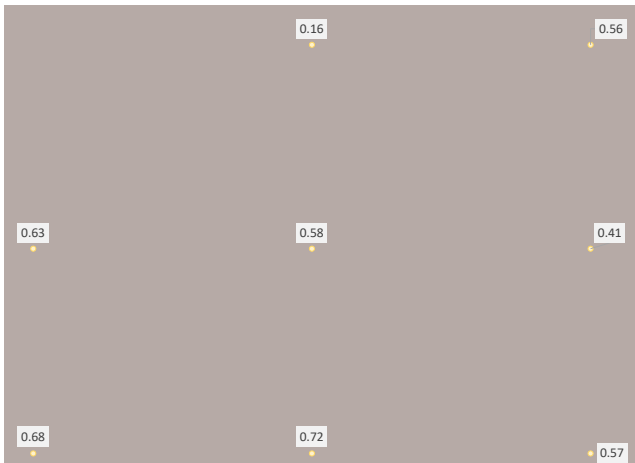
Neutral Gray
Device Average 0.54
Competitive Average 0.81
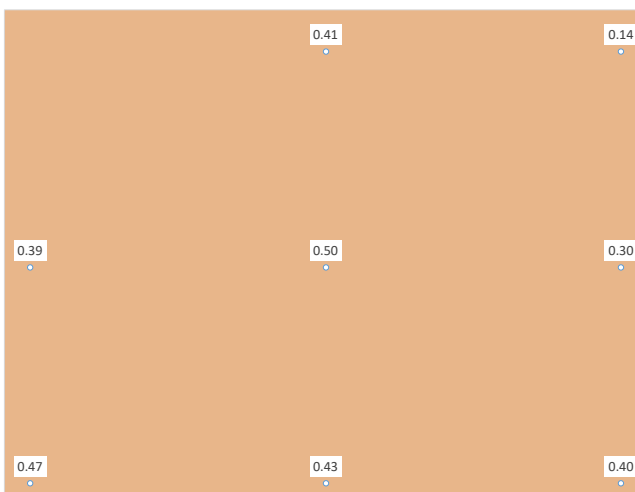
Skin Tone 1
Device Average 0.38
Competitive Average 0.83

Skin Tone 2
Device Average0.45
Competitive Average 0.63

0.92 0.24
0.12 0.18 0.35
0.29 1.10 0.40

MULTI-PANEL WALLPAPER CHART: COLOR AND LINE CONSISTENCY

★★★★★

- In BLI's wallpaper consistency test, the Roland VG2-640 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 lengths between panels measured 0.89-mm in portrait orientation, and 0.54-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 2.00, while in rotated orientation the maximum Delta E00 measurement was 1.55.

Table 8

| Color	Location on Page	Maximum Delta E00 On Panels in Portrait Orientation	Maximum Delta E00 On Panels Rotated 180°
Neutral Gray	Top	1.83	1.09
	Bottom	1.68	1.11
Skin Tone 1	Top	1.38	0.57
	Bottom	2.00	1.04
Skin Tone 2	Top	0.95	1.03
	Bottom	0.95	1.55

|		
Line Measurement Accuracy – Maximum Difference Between Panels (in mm)	0.89	0.54
Line Measurement Accuracy – Competitive Average (in mm)	0.73	0.60

USABLITY

★★★★☆

- The VG2 series has a reduced start up process that enables the printer 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 with devices 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 during cutting. 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.)
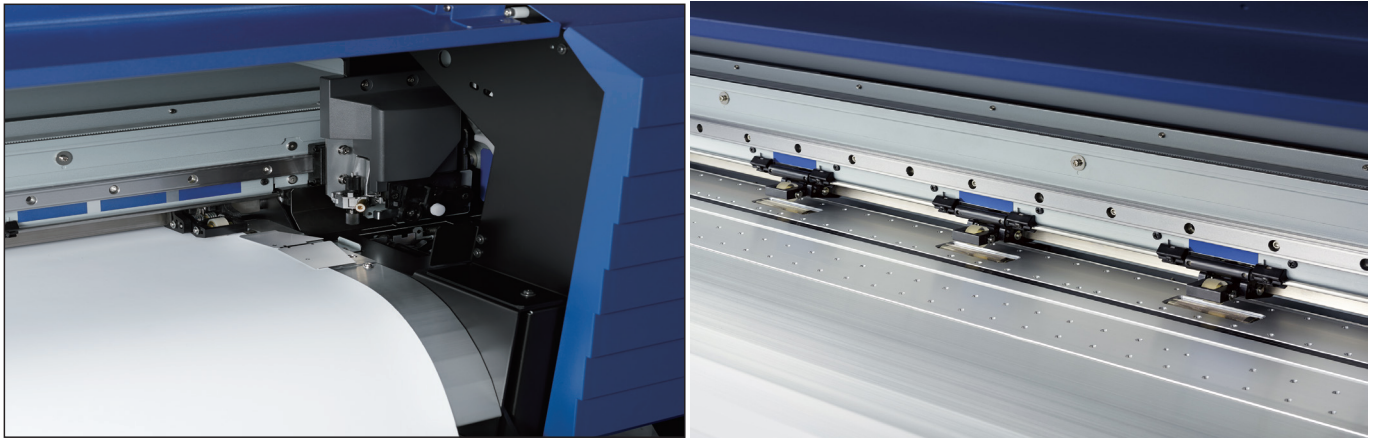
■ The Roland DG Mobile Panel app now has better connectivity, and BLI successfully utilized the app throughout the weeklong evaluation without issue. As an alternative to accessing operations at the device control panel, the mobile app provides straightforward, intuitive operation for all processes that are typically found in sub-menus at the panel.
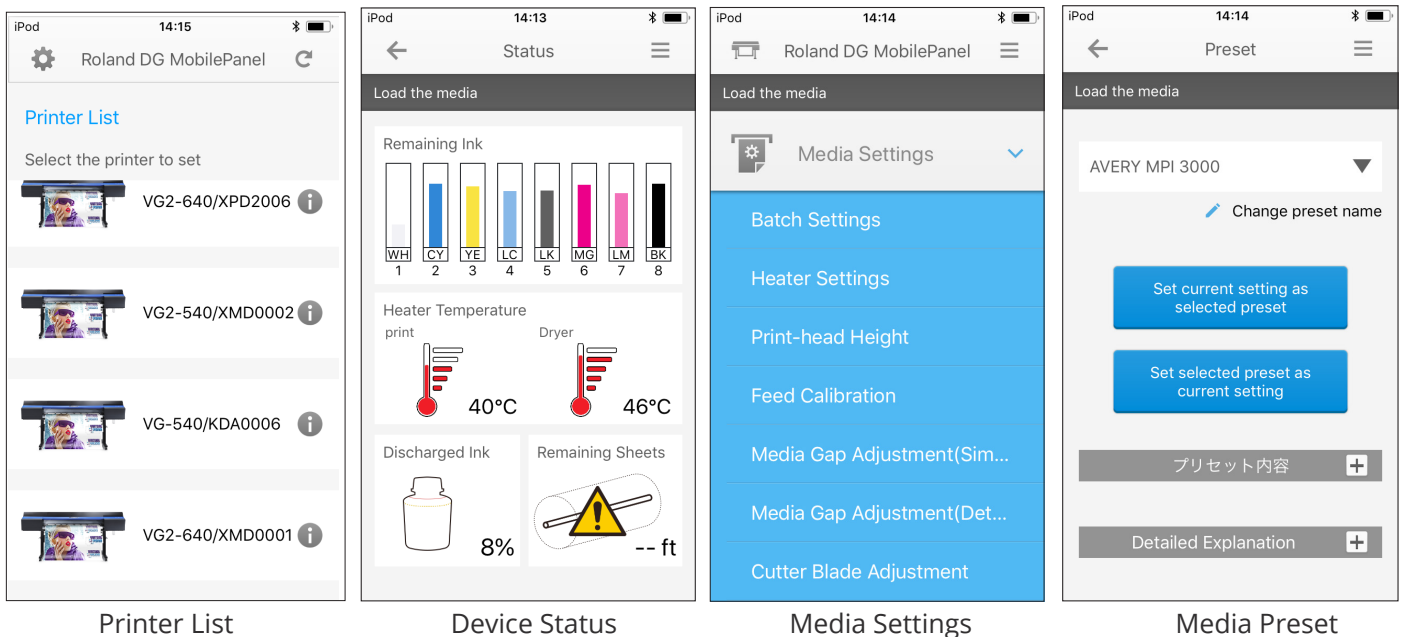

Printer List Device Status Media Settings Media Preset

- As a device is warming up, the Roland VG2-640 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 VG2-640 features three printhead height selections versus two that were available for the legacy models, enabling improved optimization of print quality.

- 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 media 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.
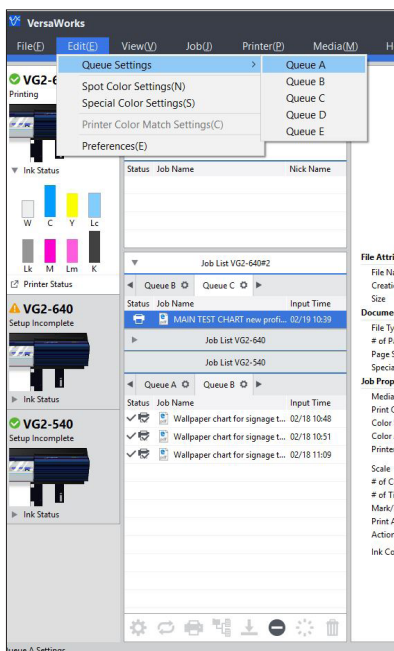
Queue Selection

SPEED   ★★★★☆

- The print speeds and all quality assessments for the dual CMYK-ink Roland TrueVIS VG2-640 were measured for two A0-size test targets using the Roland-recommended "Generic Vinyl 1" profile. When the VG-640 dual CMYK-ink device was first tested, the "PCV4" profile was used for the MPI 1105 media and the "GCVP" profile was used for the MPI 3000 media.

- As seen in Table 9, the VG2-640 printed two targets in eight minutes and 59.81 seconds on MPI 1105 at the high speed/4 pass setting, which is 30.4 percent faster than the competitive average. At the high quality/8 pass setting it took 14 minutes and 17.57 seconds to print, which is significantly faster than the competitive average, by 53.6 percent.

- As seen in Table 10, on Avery Dennison MPI 3000 media, the VG2-640 using the same "Generic Vinyl 1" profile produced the two targets in 8 minutes and 55.28 seconds at the high speed/4 pass quality setting, which is 20.3 percent faster than the competitive average.

Table 9

VG2-640 Dual CMYK	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/4 Pass	269.24	539.81	775.84	+30.4%
	Std/6 Pass	318.53	638.00	*	*
	HQ/8 Pass	426.85	857.57	1847.94	+53.6%

VG-640 Dual CMYK (Previous model)	Profile/Quality Setting	Speed (sec)	Speed (sec)
	PCV4	Job	Jobs
MPI 1105	HS/4 Pass	237.94	478.88
	Std/6 Pass	179.00	563.12
	HQ/8 Pass	374.19	750.76

Table 10

VG2-640 Dual CMYK	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 3000	HS/4 Pass	265.72	535.28	671.63	+20.3%
	Std/6 Pass	319.25	643.34	*	*
	HQ/8 Pass	427.28	861.53	*	*

VG-640 Dual CMYK (Previous model)	Profile/Quality Setting	Speed (sec)	Speed (sec)
	GCVP	1 Job	2 Jobs
MPI 3000	HS/4 Pass	230.56	463.56
	Std/6 Pass	278.94	563.28
	HQ/6 Pass	372.82	748.03

* 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 dual CMYK VG2-640 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.

KEYPOINT INTELLIGENCE
Buyers Lab

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