

TrueVIS AP-640

Advanced Guide

Dealer Version

 **Roland**

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Roland DG
EPMT

■ Introduction

What is the TrueVIS AP-640?

The AP-640 is Roland DG'S first water based, Resin printer. Dual, staggered printheads with variable dot printing and True Rich Color presets offer natural, vibrant print results with class leading color gamut. While the AP-640 can create the wide range of applications required by todays demanding graphics markets, Key features may be better suited to companies that specialize in sectors such as Vehicle Wrapping, Exhibition Graphics or Interior Décor. This document will outline more on these key features and help you explain them better to potential buyers alongside information previously provided in your Dealer Product Guide.

“The AP-640 is the first 4 color device that we have tested that has achieved 5-star status for color accuracy”

David Sweetnam, Director of Lab services, Keypoint Intelligence.

Please Note:

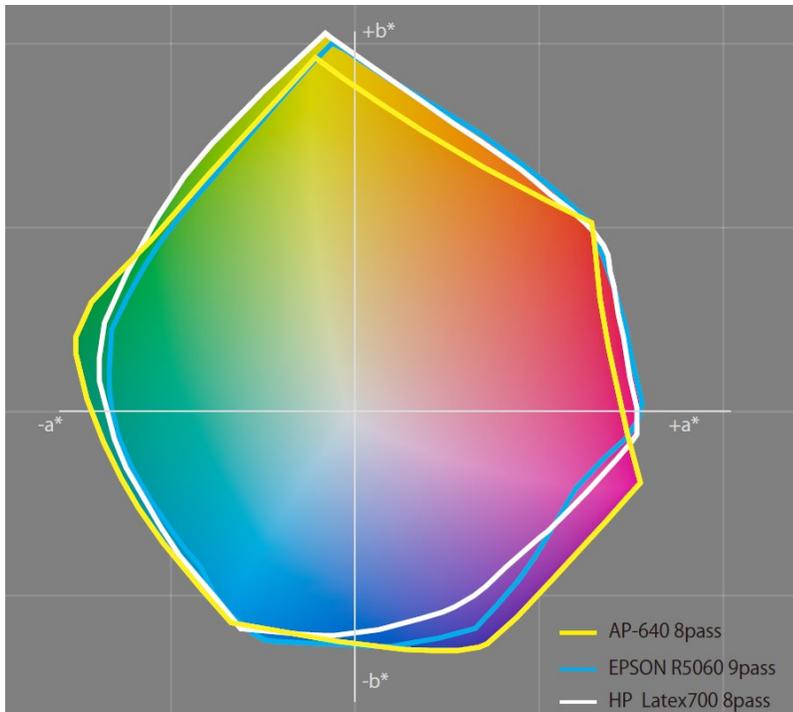
The information presented here has been collected from various sources including internal and external testing. All information is deemed correct at time of creation and every effort to validate and show results accurately has been taken.

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■ Color Gamut

Although AP-640 “only” has 4 colors, doesn’t mean we have less gamut. The high saturation TA inks perform incredibly well even when compared to 6 color competitive devices. Key colors such as Greens, Blues and Purples perform excellently and add to the overall color reproduction qualities making corporate color matching much easier.



“The AP-640 has the Largest color gamut measured on a resin/latex device tested to date”

Keypoint Intelligence.

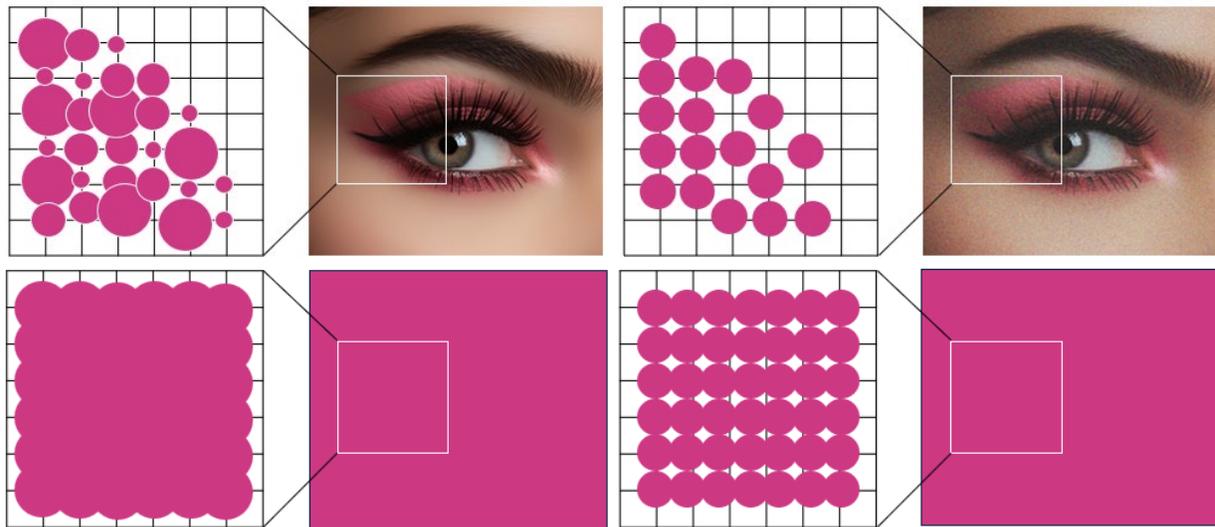


Please remember that light colors don’t add to overall color gamut – Light Cyan and Light Magenta can easily be produced by using a percentage of Cyan or Magenta ink. Also, using a percentage of Magenta to reproduce Light Magenta can in many cases save on ink usage. To achieve 100% Light Magenta, a 6-color printer may have to use 100% of the light magenta ink. In contrary, a 4-color printer can achieve a light magenta finish with only say 50-60% Magenta ink usage.

Also, some devices use light colors to help mask print related issues such as coarse or grainy print caused by their fixed dot ink firing technology. Without light colors, these printers struggle to create fine detail in lower percentage areas of ink. The AP-640 with its variable dot head technology has the best of all scenarios, small precise dots for high detail and larger drops for seamless, flat solid fills.

Variable Dot

The AP-640 has two, variable dot printheads in staggered formation. Automatically controlled by the RIP, these heads deliver multiple size ink droplets to the media with exceptional precision. Typically, smaller dots give a smoother, higher quality print result and larger dots are useful where there is a large area of color to reproduce. However, some competitor devices only have fixed size dots, and these can make photographic prints appear rough or grainy.



Variable dot AP-640

Fixed dot competitor

The advanced capabilities of the AP-640 variable dot printheads allows for 3 sizes of ink drop to be printed simultaneously. The table below shows the drop sizes available in picolitres and highlights the best of all cases capabilities that the variable-dot sizes allow. Smaller dots for finer detail and larger dots for flat, solid fills of color. In fact, compared to similar competitive devices, the AP-640 is capable of printing dots in both smaller and larger sizes allowing for both finer detail and better large area coverage. Another key benefit to the precise, and thin ink layering of AP-640 prints is that media surface finish is retained, matte media is printed matte, and gloss keeps a gloss finish.

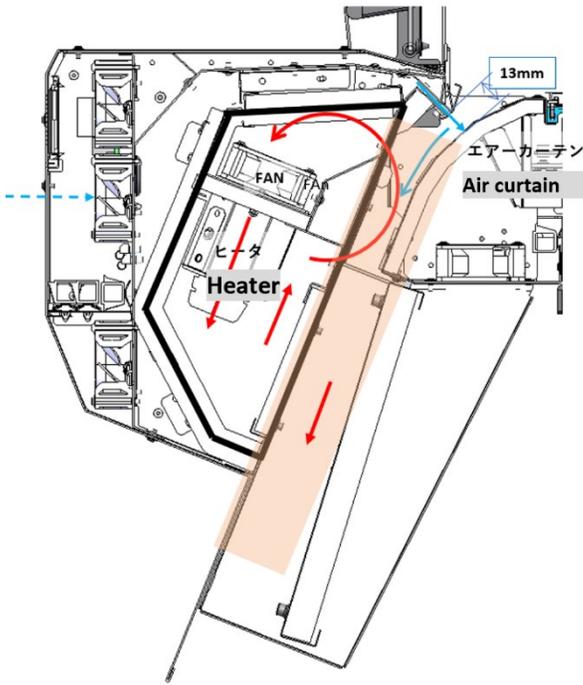
Printer	Dot Size 1	Dot Size 2	Dot Size 3
TrueVIS AP-640	5	9.5	15
Competitor 1 (3rd generation)	12	N/A	N/A
Competitor 1 (4th generation)	10	N/A	N/A



■ Ink Curing

To complement the precise ink delivery of the heads, the AP-640 has an incredibly efficient dryer system to fully cure the ink. This dryer uses 6 internal fans to heat and then recirculate the warm air within the dryer.

With its advanced “air curtain” functionality, more warm air stays inside the dryer which reduces electricity consumption and prevents heat escaping the dryer so there is no impact on the local working environment. The efficiency and heat stability of the dryer also prevents flash overheating and heat stress on the media. This also helps keep the dimensional stability of the media and print accurate to help the finishing and installation steps.



With other devices, the higher curing temperatures and inefficient dryers can overheat the media causing issues later in production. Also

escaping heat warms the immediate working area and can cause discomfort for the operator. With AP-640, the prints exit the dryer at a low temperature and are ready for immediate finishing.

3rd Generation Competitor



Platen

60°C



Take-Up

37°C



1m from printer

27°C

Check the Following Pages in Sample Book



▪ Instant Dry/Finishing

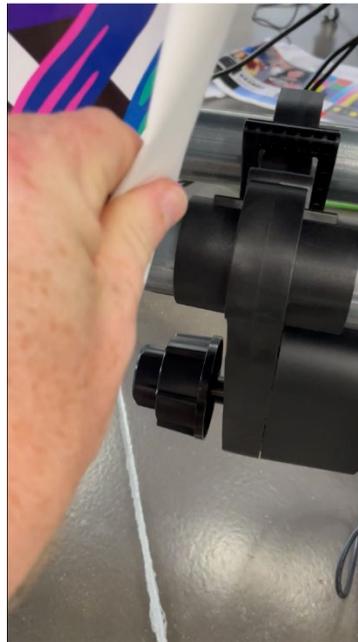
With AP-640 the prints exit the dryer at a low temperature, are completely dry and are ready for true, immediate finishing. Some competitors claim that they also have immediate finishing, but the major media manufacturers often counter this and recommend a period of between 6-24 hours before finishing to ensure no delamination issues.

Other inks, even eco-solvent with a fast-drying time do not fully dry as they come off the printer and can cause issues if prints touch face to face. AP-640 cured prints are so dry as they leave the printer that its possible to rub printed surfaces together and still not damage the print.

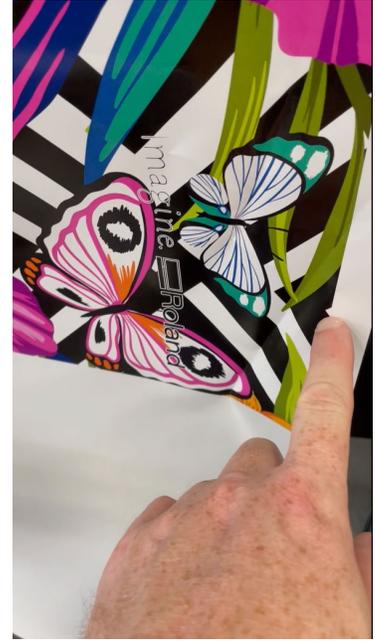
With this level of readiness, customers should have every confidence to laminate prints in most cases directly from the printer.



1)Printed image at take-Up



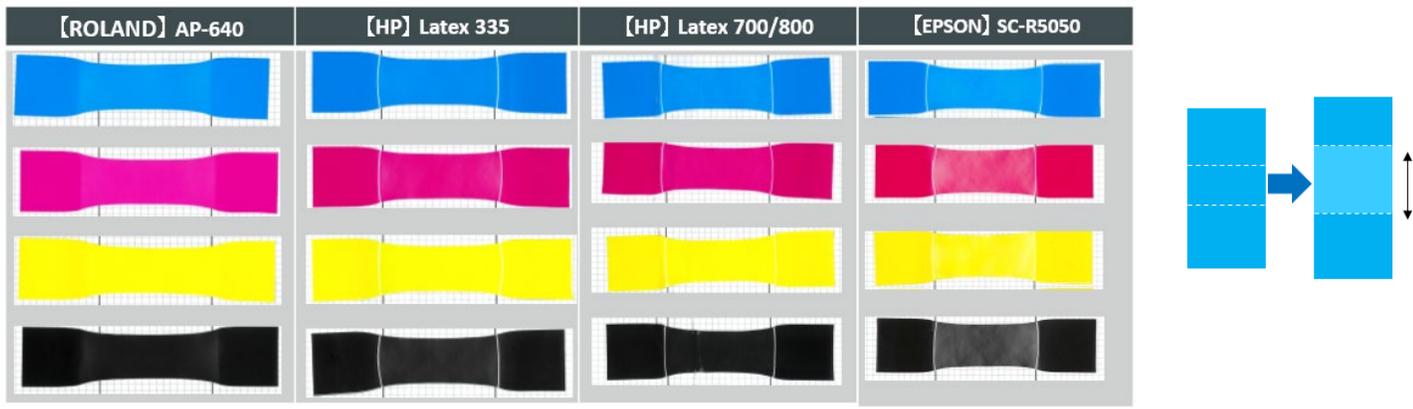
2) Rubbing print surfaces together



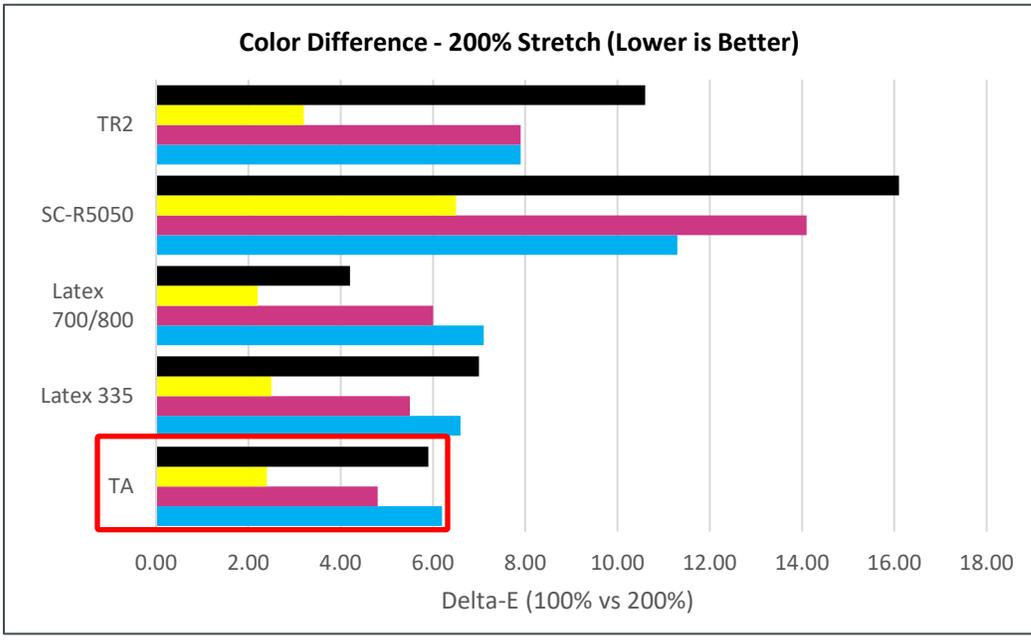
3) No damage to print

▪ Ink Stretch

The TA ink in AP-640 performs very well when media stretch is required for an application. When stretched to 200%, AP-640 prints retained more of their overall color than competitor devices and TR2 ink from the eco-solvent range.



The below graph shows the Delta-E difference between the colors when printed and at 100% (no stretch) compared to when the media is stretched to 200%. The lower the Delta-E number, the closer the colors are.



■ Color Stability

The combination of high gamut inks and precise dot placement from the long life printheads allows the AP-640 to repeatedly produce accurate colors over long production runs. This is useful not only to preserve color through a job, but also to have confidence that if additional prints are required, they will match to the original output. Competitor devices with “user replaceable” consumable heads always struggle to retain color accuracy as the nature of their print head technology is to decline until it is no longer useable and is then replaced. By then printing with a combination of heads each with a varying level of performance, color accuracy and repeatability is very challenging.



Print 1 Print 13 Print 1 Print 13

Sample prints at 2m long, repeated 13 times on 30m roll.

	D-E00 Average		
	AP-640	Latex 700	SC-R5050
A1	0.27	1.52	5.18
A2	0.28	0.97	1.97
A3	1.05	0.70	5.05
A4	0.28	0.28	0.51
B1	1.97	3.02	4.92
B2	0.62	0.41	4.79
B3	0.28	1.17	1.74
B4	0.42	0.91	1.71
C1	0.64	1.09	4.45
C2	0.32	1.18	3.67
C3	0.11	0.74	1.93
C4	0.85	1.56	3.55
D1	0.57	1.61	4.75
D2	0.51	1.00	2.62
D3	0.27	1.01	3.21
D4	1.20	1.35	5.03
E1	0.71	2.30	3.6
E2	0.19	0.68	2.09
E3	0.64	1.04	5.68
E4	1.26	1.08	5.31
F1	0.91	1.37	4.22
F2	0.43	1.51	2.4
F3	0.66	1.41	3.07
F4	0.59	0.48	2.67
Avg	0.63	1.18	3.51

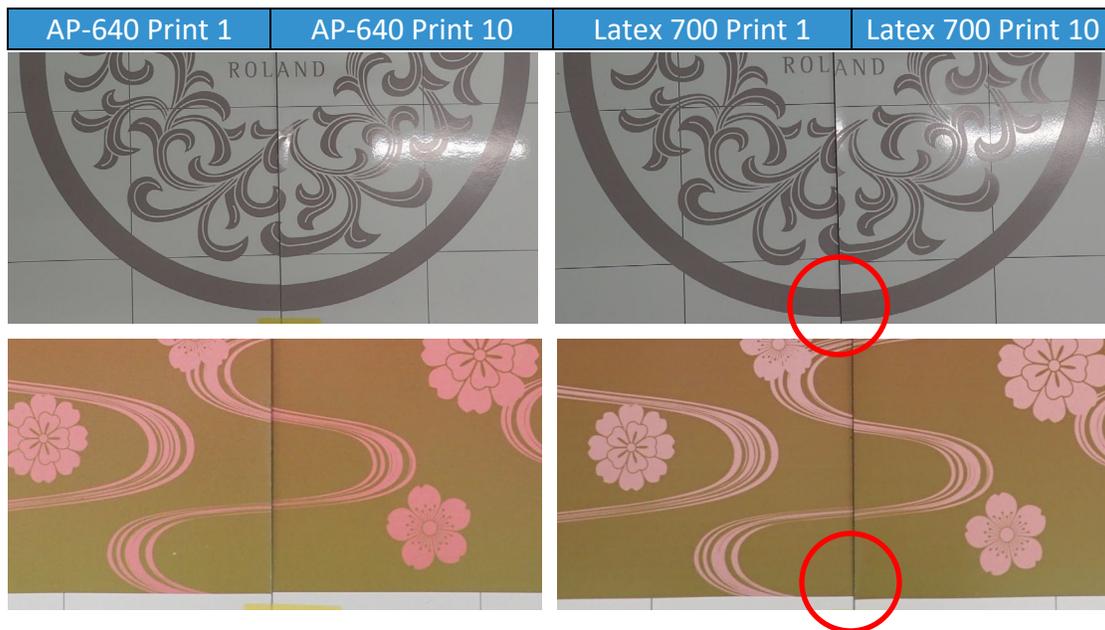
“Color matching was very impressive with the device earning our coveted five-star rating”
 Keypoint Intelligence.

When comparing a selection of commonly used colors, repeated 10 times over a 25m distance, its clear to see the advantage and superior color stability the AP-640 has over the competition.



■ Multi-Panel – Alignment & Dimensional Stability

Efficiency in the dryer system and precision ink layering also allows in many cases for the media to be cured at a lower temperature, further easing the impact on the media surface. This in turn allows for much greater dimensional accuracy and repeatability of printed panels making alignment for key applications such as wall coverings or vehicle wrapping far more accurate than some competitive systems.



With any print technology, printed length can be challenging, especially where higher temperatures are required for curing of ink. Arguably, if large prints are within a small tolerance of expected size this is acceptable, but the key element is the consistency and repeatability of the size you have produced. AP-640 performs excellently in this area and offers much better consistency when compared to the competition with only a 0.5mm delta when printing 10x 2.5m panels. In comparison, the Latex 700 device showed a delta of up to 2.5mm which could cause major issues where accurate alignment is required.

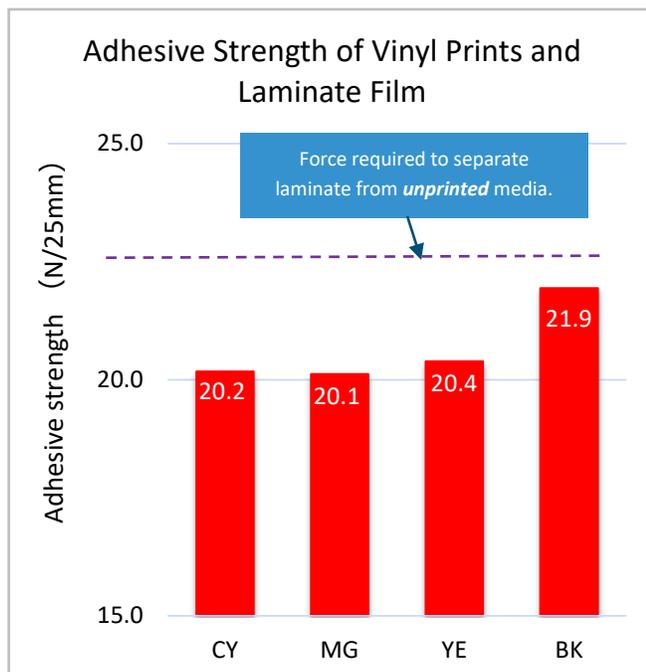
	Data	AP-640	Latex 700
1st Print	2,500mm	2,501.5mm	2,498.0mm
5th Print		2,502.0mm	2,500.0mm
10th Print		2,502.0mm	2,500.5mm
Length Delta	0.0mm	0.5mm	2.5mm

■ Lamination Strength

AP-640 inks have undergone significant testing in relation to the laminate adhesive strength when applied to printed products. For key applications such as vehicle wrapping, it is vital for laminate film to have a suitable fix on the printed media to guarantee performance of the product and avoid costs or inconvenience to the print producer and their customers caused by “De-Lamination”.

The below table shows how AP-640 prints that were laminated immediately after printing, performed over a 6-month period when subjected to various conditions. Even when subjected to high temperatures for prolonged time, no change in condition of the prints was evident.

Media	Laminate	Base Material	Test Period	Test Temp	Evaluation Results
3m IJ1220	Oraguard200	Acrylic Panel	6 Months	45°C	No Change
	IJ4131			60°C	
45°C					
60°C					
45°C					
Orajet 3164G	Oraguard200			60°C	



In addition, the adhesive bond between the laminate and the printed image was measured. AP-640 prints require an average of 20.65N/25mm of force to remove the laminate film from printed vinyl.

When you consider that to remove laminate film from *non-printed vinyl* only requires around 22n/25mm, its clear to see that AP-640 inks create a very strong bond to the media and maximize laminate adhesion to printed surfaces.

■ Environmental

A strong ecological message can be important to some potential buyers, whether for their own benefits or as an additional benefit to offer to corporate customers. The TA Resin ink for AP-640 conforms to the highest safety standards available and is certified by several authorities as compliant for even the strictest regulated public tenders.



GREENGUARD Gold certification means products contribute to safer, healthier air. Tested products are screened for more than 15,000 VOCs known to pollute indoor air quality.



The AgBB scheme is probably the most important European test scheme for product emissions and defines the suitability of the tested products for indoor use (hazard prevention). Evaluating parameters from TVOC, TSVOC, VOC without LCI, C-substances and the R-value concept, it forms the basis for many voluntary test labels.



Since 2012, construction products, decoration and furnishing products to be traded in France are to be labelled with an emissions classification based on VOC emissions tests. The basis of testing is ISO 16000.



ECOLOGO Certifications are voluntary, multi-attribute, life cycle-based environmental certifications that indicate a product has undergone rigorous scientific testing and exhaustive auditing to prove its compliance with stringent, third-party environmental standards.

▪ Media Certification

The Resin ink and lower heat curing of AP-640 printed graphics give excellent media compatibility and minimize the impact of ink on the media. This allows the media to retain its main characteristics which is especially important for challenging applications when an expected lifecycle of the graphics is required and aids the instant finishing of AP-640 printed media.

Currently, AP-640 is covered by Avery Dennison ICS Performance Guarantee. ICS combines Avery films with other qualified components to form a system which is guaranteed to be compatible for key applications and provide superior performance. ICS is only granted for ink types after rigorous scientific testing and prints have met a very stringent set of durability and physical performance specifications.



Confirming the instant finishing, **no additional measures for AP-640 prints** are listed in the Durability Bulletin provided by Avery. In contrary to this, Avery revised the “**HP Durability bulletin 1.8.3**” requiring addition steps to be taken to certain Latex ink prints to avoid De-lamination. One element of this additional check involves waiting for 24 hours after printing to ensure full ink curing has taken place.

The following certifications are also under way:



▪ Running Costs

One main difference from AP-640 to some competitor devices is the use of long life, variable dot Piezo printheads. HP systems use a fixed dot, thermal printhead that is consumable and due to this its lifespan is limited. HP heads are warranted to last for only 1.5 litres of ink throughput, generally they should last longer and for our financial evaluation we have based HP head life at a **generous 6 litres** of ink.

HP claim their heads are better as they can be easily replaced by the end user and are cheaper than Piezo. HP heads are easily replaced, but the long-life Piezo heads in AP-640 preserve color accuracy and minimize running costs as heads are covered in equipment warranty. Based on an average head life of 6 litres for HP700 head, a device printing 5 hours a day for a year would require 100 print head replacements at a cost of over **€14,000**. To put this in context, a full 2nd year warranty for AP-640 is only €2,346 and covers not only the printheads but all components of the printer. Even without warranty, for an HP700 device to be more cost effective on head costs, based on the same production parameters, each HP head would need to print over **30 litres** of ink.

	AP-640	Latex 700
Head Price	€ 0.00	€ 141.00
Head cost Per cc*	€ 0.00	€ 0.024
Ink Capacity	700	1000
Ink Price	€ 105.00	€ 108.00
Ink €/cc	€ 0.15	€ 0.11
Ink Usage cc/m ²	16	29.54
Ink Cost m ²	€ 2.45	€ 3.19
Head cost m ²	€ 0.00	€ 0.69
Total Cost m ²	€ 2.45	€ 3.88
Electricity		
Power (KW Print Peak)	4.00	5.00
KW/H Cost	€ 0.28	
Hourly Cost (Print)	€ 1.12	€ 1.40
m ² /h Standard	14.6	17
Power Cost m ²	€ 0.077	€ 0.082
Total Costs	€ 2.52	€ 3.97

“If you were to print 6hrs a day, 5 days a week for 2 years on the Latex 700 you would use about 170 printheads at \$170 each. For total cost of about \$28,000 over those 2 years”.

Andy, IT Supplies, HP Dealer USA Via YouTube

Finally, factor in also that due to the superior print quality, lower resolution prints from the AP-640 perform better than higher resolution from competition. Lower resolutions would reduce ink usage and increase printer productivity at no detriment to print quality as highlighted by Keypoint evaluation, further increasing the profitability of the device.

“Unlike most resin/latex tested competitors, AP-640 was able to use the same Standard, 8 pass setting on cast vinyl which is judged for salable quality at the closer, more challenging 600mm viewing distance. This resulted in the AP-640 delivering the fastest overall productivity results” Keypoint Intelligence.

■ Vehicle Wrapping

The AP-640 benefits from several key features that are ideally suited for specific applications or markets such as Vehicle Wrapping.



- **Media Compatibility**

AP-640 inks have excellent adhesion to cast vinyl



- **Media Impact**

Thin ink layer and efficient curing from the dryer preserve media characteristics



- **Instant Dry/Instant Finish**

For fast production and minimizing time off road for customers vehicles



- **High Laminate Adhesion Strength**

Preventing costly de-lamination issues



- **High Ink Stretch**

For wrapping the most challenging of surfaces



- **Color Stability**

Ensuring additional vehicles or panels are color correct



- **Panel Alignment Accuracy**

Reducing application time and costly re-prints



- **Media Certification**

Confidence that printed media can perform to specification



- **Environmental Messaging**

Appealing to corporate brands



“We've had some jobs where we've supplied everything to a fitter and they've forgotten a file or forgotten a print and they've said “We're about to finish this wrap and we've forgotten something. Can you help us out?” before you could slave away on a printer, but with the AP and how quick and versatile it is, It means we can just print what we need then immediately laminate it, get it trimmed up and then fitted on the car. It's a machine that will get you out of trouble. We know that we've got a product here that not only complements what we need, but also something to take our business that next level”

Chris Dunning - Owner, Elite Wrappers

■ Exhibition Graphics

The AP-640 benefits from several key features that are ideally suited for specific applications or markets such as Exhibition Graphics.

- 
 - Media Compatibility**
 AP-640 inks have excellent adhesion to a wide range of exhibition media
- 
 - Media Impact**
 Thin, precise ink layer preserves media finish –
 Matt/Matt, Gloss/Gloss
- 
 - Instant Dry/Instant Finish**
 For fast production and meeting demanding deadlines
- 
 - Color Stability**
 Ensuring all graphics and multi-panels are color consistent
- 
 - Panel Alignment Accuracy**
 Reducing application time and costly re-prints
- 
 - Environmental Messaging**
 Peace of mind for interior applications and appealing to corporate brands



“The first Resin/Latex printer we introduced had many problems such as unstable output and poor color matching in panelled prints. When considering counter measures, we heard that Roland DG had released a new water-based Resin printer and immediately started considering it. As a result of test prints from Keishi Paper for event decoration, the decisive factor for introduction was that the printing speed was fast and the color was vivid, not what was expected from water-based Resin ink. When I used the AP-640, the color difference during panelled output, which had been a problem on similar devices, disappeared completely. The feed accuracy is also high, and the problem of dimensional difference and misalignment has been solved. The print speed is also fast, and I was so surprised at the high print quality that I couldn't believe it was a four-color print. In particular, blue and green tend to be dull in similar devices, but AP-640 resin inks output more vivid colors than a six-color printing machine. The black color is also good, and the letters can be expressed clearly. I also appreciate the fact that printing starts within just a few minutes from the media set. Compared to other printers, I didn't think there would be such a difference between the water-based Resin or Latex printer”.

Hidenori Yokoi – Deputy Manager, Sakura International Co. Ltd

▪ Wallcoverings / Decor

The AP-640 benefits from several key features that are ideally suited for specific applications or markets such as Wallcoverings and Decor.



- **Media Compatibility**

AP-640 inks have excellent adhesion to a wide range of standard wallcoverings



- **Market Ready Application Support**

AP-640 inks are compatible with Type 1 & 2 wallpapers supporting domestic and commercial opportunities



- **Instant Dry/Instant Finish**

For fast production and meeting demanding deadlines



- **Color Stability**

Ensuring all wallcovering panels are color consistent



- **Panel Alignment Accuracy**

Reducing application time and costly re-prints



- **Environmental Messaging**

Peace of mind for interior applications in sensitive areas and appealing to corporate brands

Check the Following Pages in Sample Book

