



Jetbest Corporation

Technical information on New ECO ink

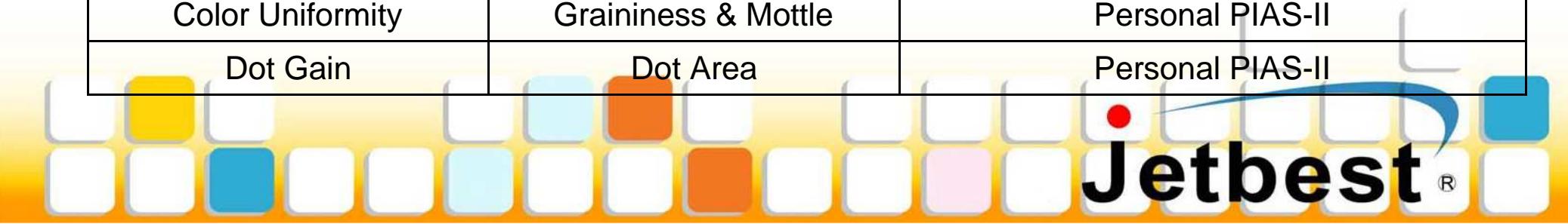
JETBEST new eco Inks
vs.
ROLAND ecosolmax Inks

Jetbest R & D Department



Benchmarking the Print Quality of Two Ink Types

Test Parameters	Roland	Jetbest
Printer	VS-540	VS-540
Material	3M Controltac	3M Controltac
Setting	High quality/1440 dpi	High quality/1440 dpi
Ink	Roland ecosolmax ink Ink	Jetbest new eco Ink
Measurements		
Print Quality	Metrics	Instrument
Tone Reproduction	Density	GretagMacbeth® Eye-One
Color	L*a*b*	GretagMacbeth® Eye-One
Color Gamut	L*a*b*	GretagMacbeth® Eye-One
Sharpness & Details	Line Quality	Personal PIAS-II
Intercolor Bleed (ICB)	Line Width	Personal PIAS-II
Color Uniformity	Graininess & Mottle	Personal PIAS-II
Dot Gain	Dot Area	Personal PIAS-II



jetbest®

Instruments



PIAS®-II
Personal Image Analysis System



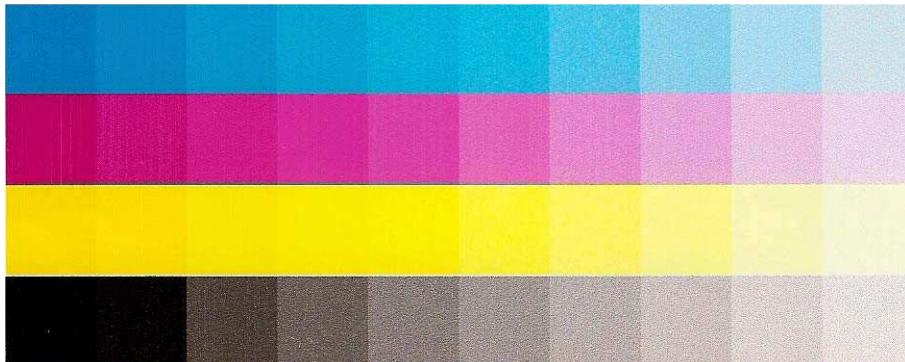
GretagMacbeth® Eye-One



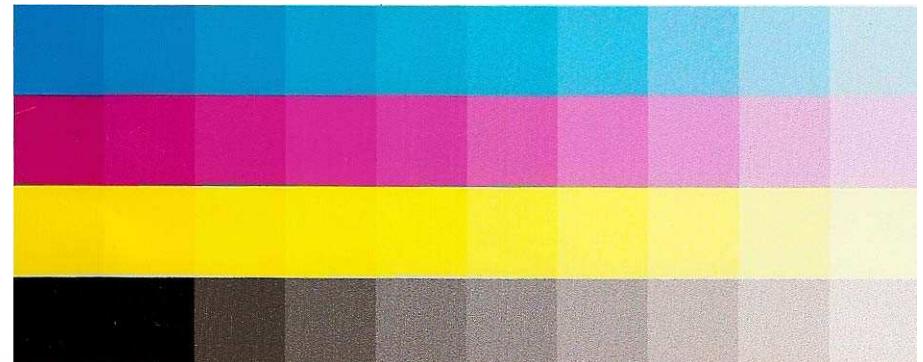
Tone Reproduction Curves (TRC)

- Tone reproduction curves show the relationship between optical density and tone%, or in other words, the input-output relationship in a printing system.
- Tone reproduction data can be obtained by means of either the Eye-One or the Personal PIAS-II.
- Measurement accuracy for density and color is usually higher for the Eye-One than the camera-based Personal PIAS-II.
- **The TRCs below show that the two ink types exhibit almost identical tone reproduction (or input-output) characteristics.**

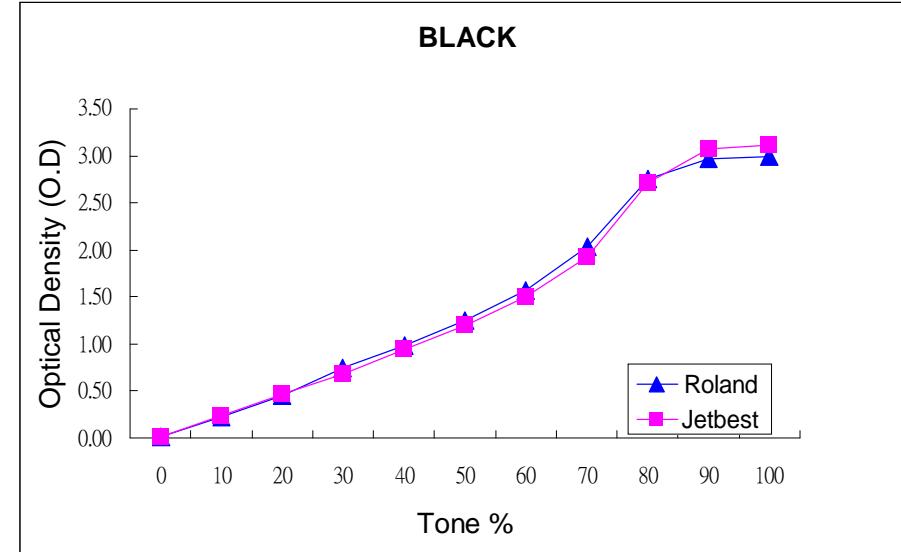
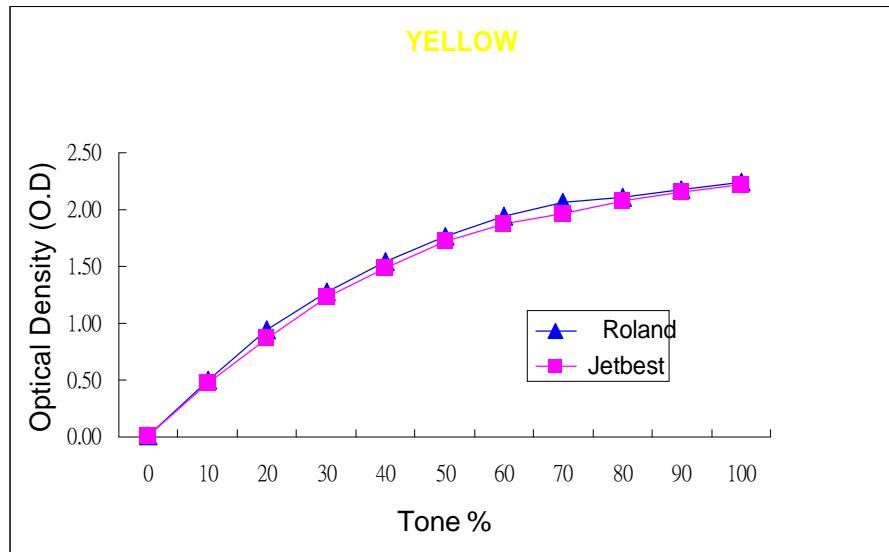
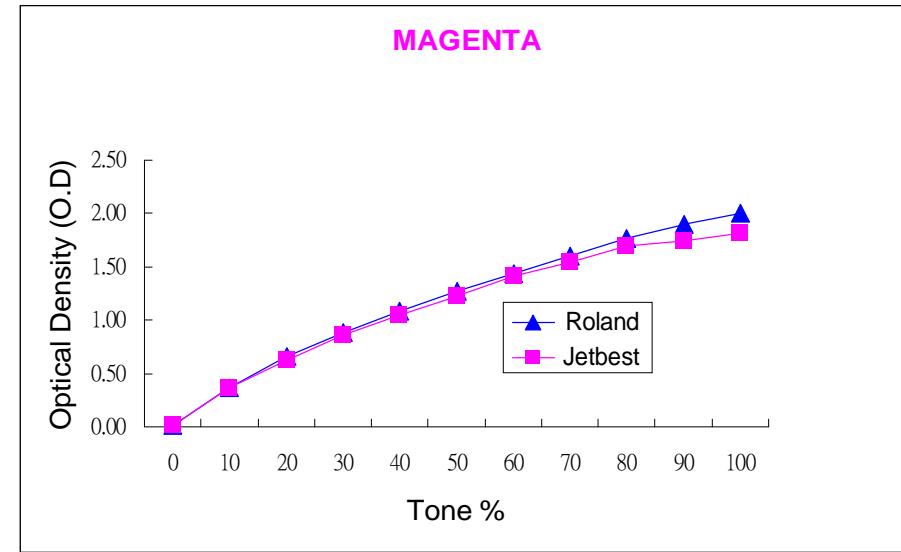
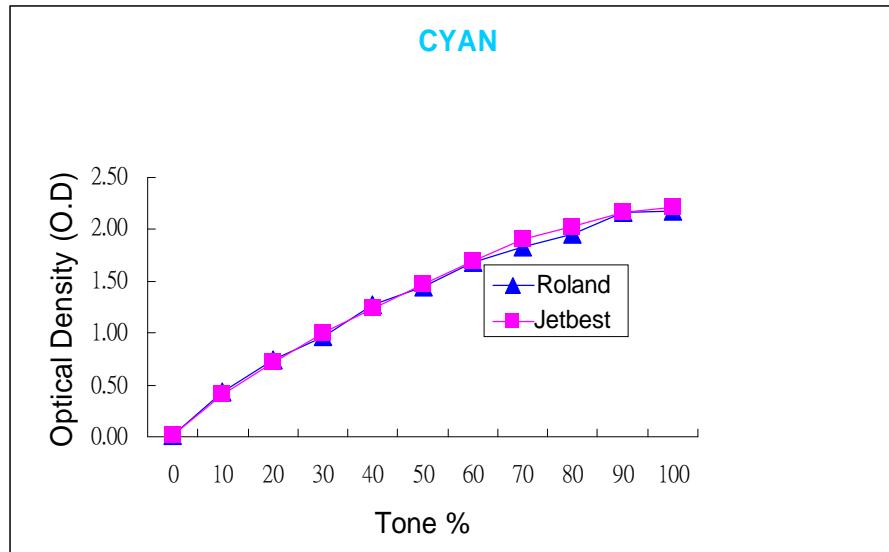
Roland ecosolmax



Jetbest new eco

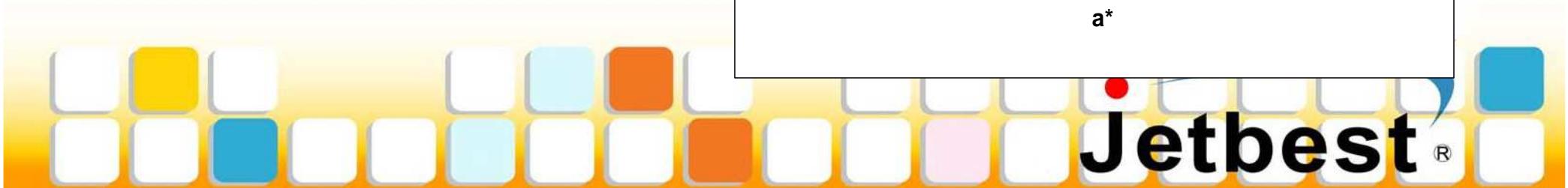
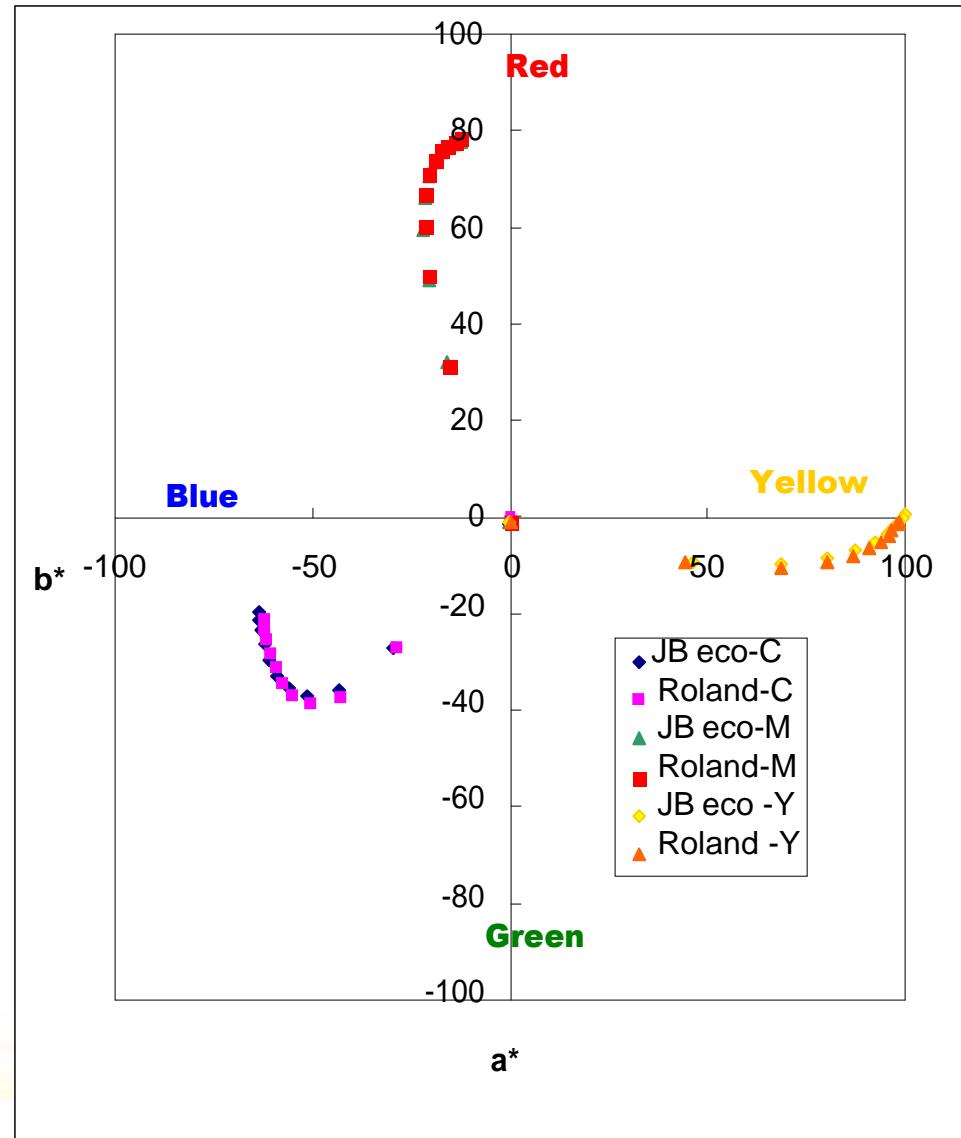


Tone Reproduction Curves (TRC)

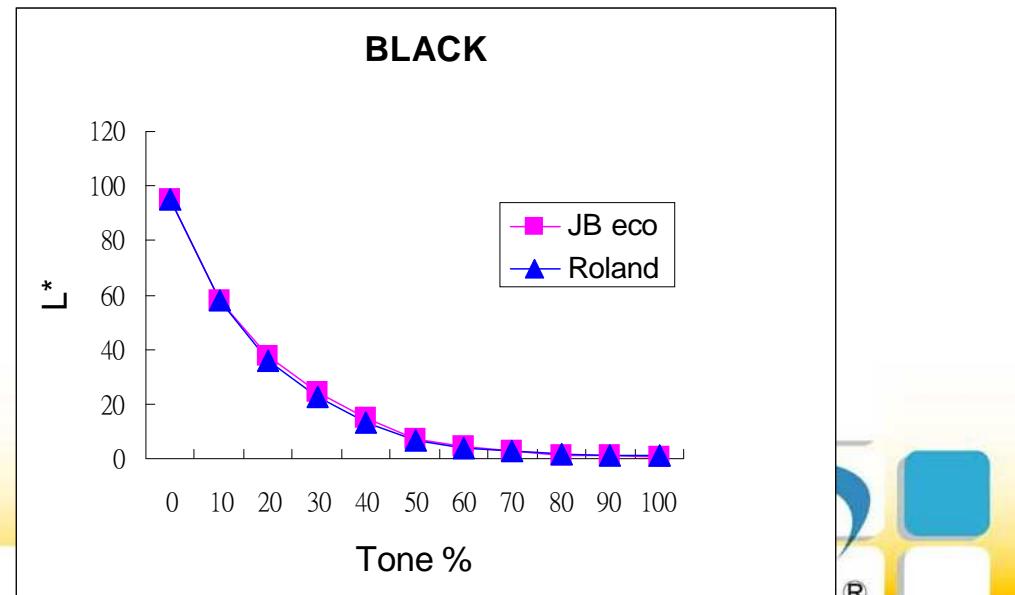
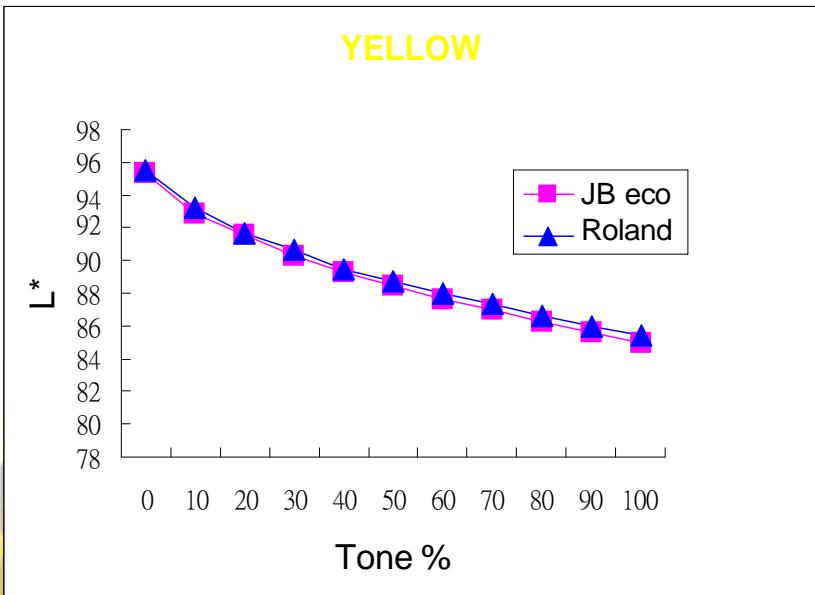
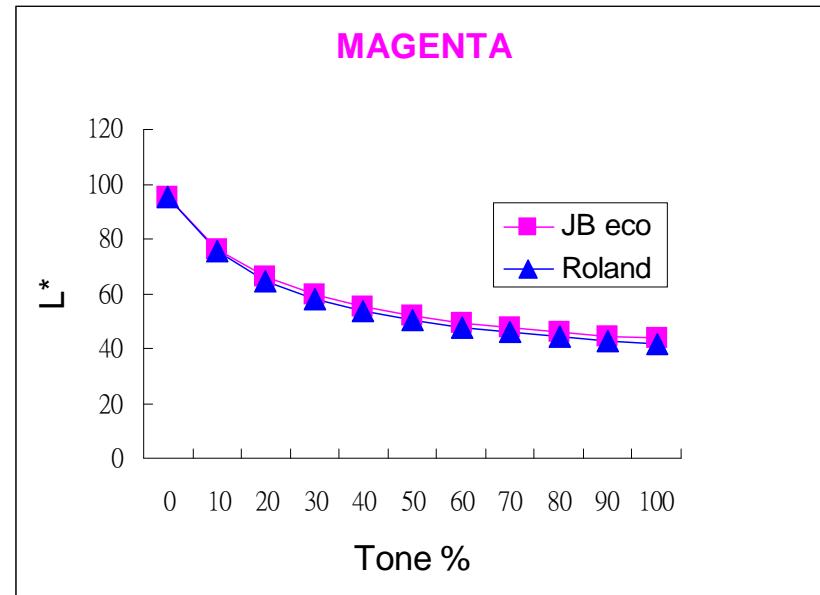
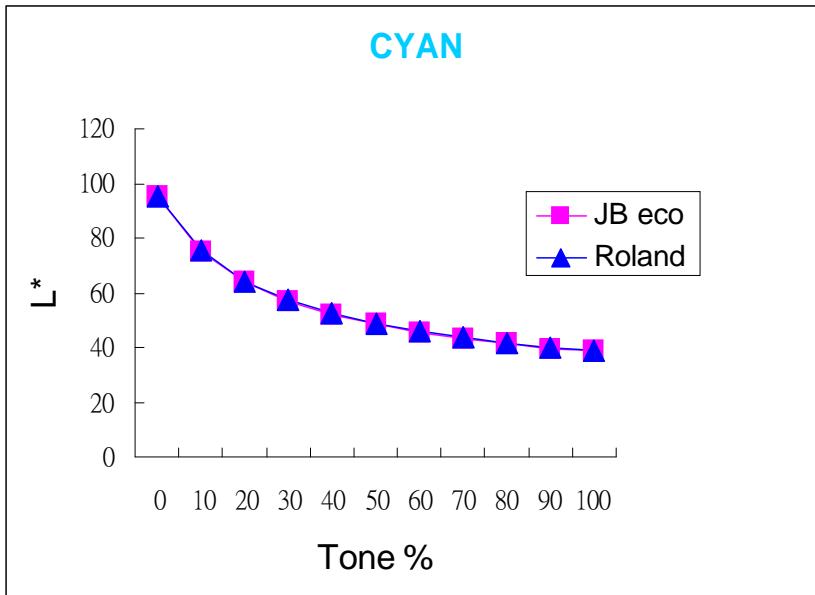


CIELab Color

- CIELab or L*a*b* color data here are obtained using the GretagMacbeth® Eye-One.
- The results are plotted in (a) an a*-b* plot, and (b) Tone%-L* plots.
- **The results here show that the color characteristics for the two ink types are quite similar.**



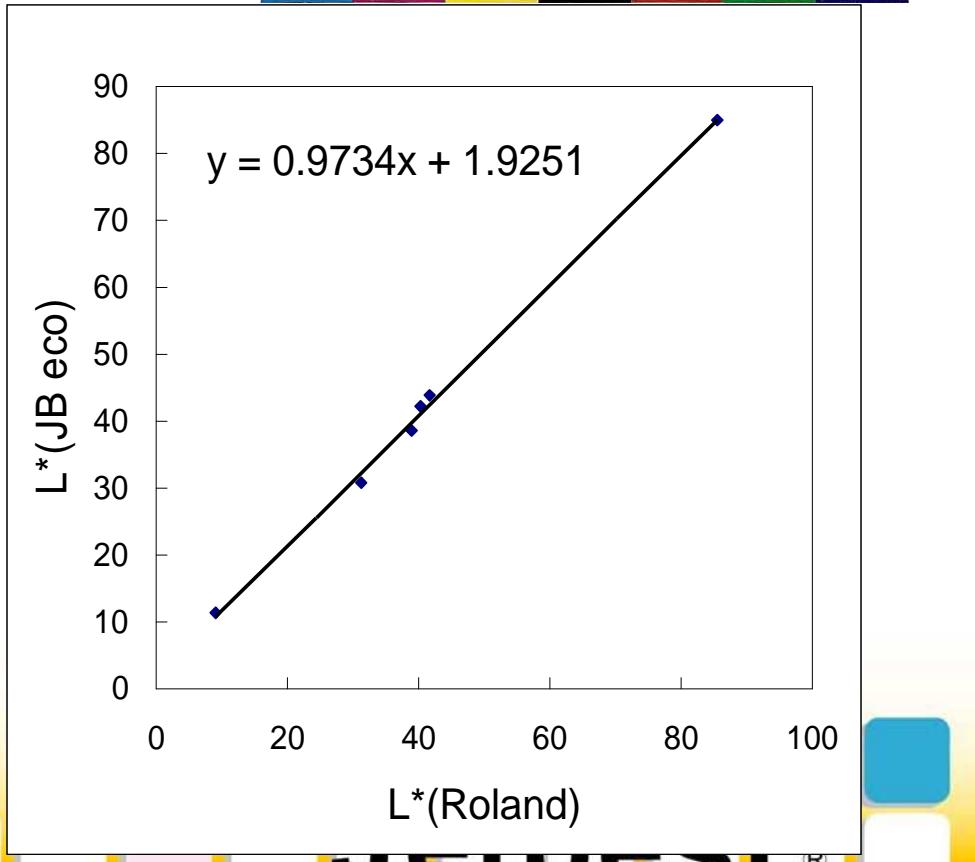
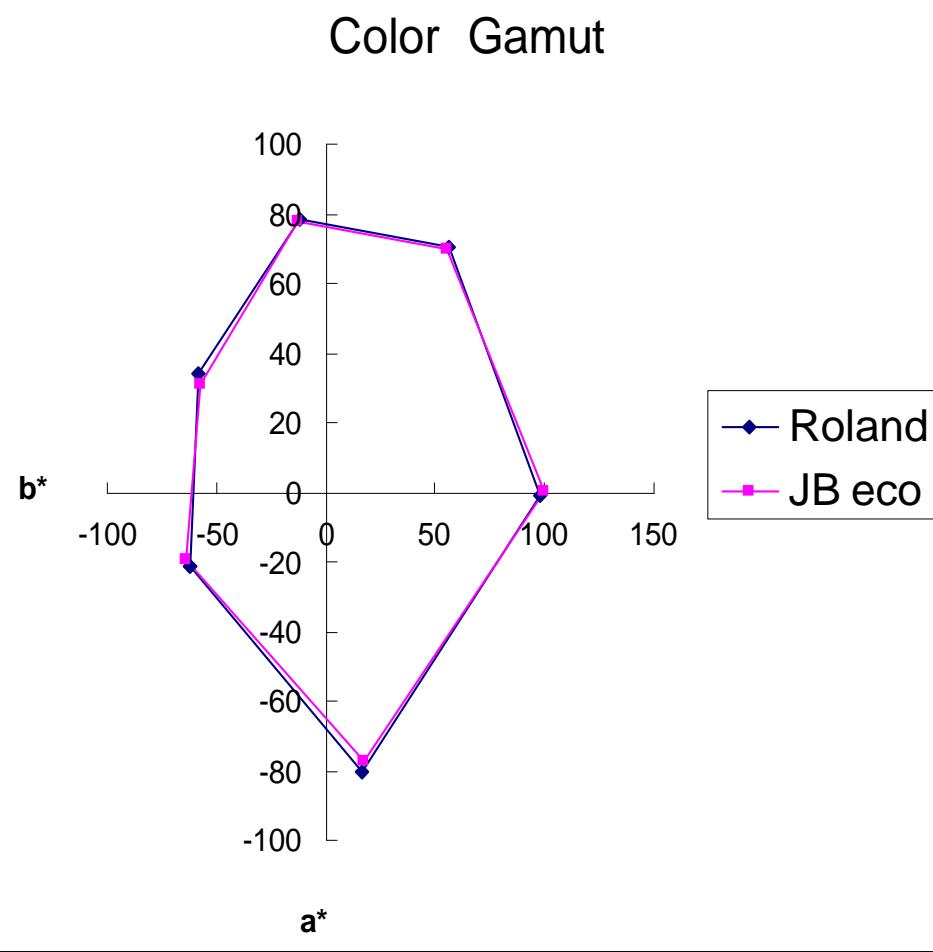
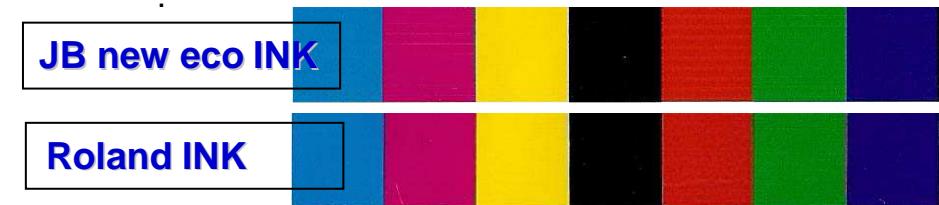
CIELab Color



Color Gamut*

Illuminant:	D50
Observer:	2 deg
Color Density Standard:	Status T

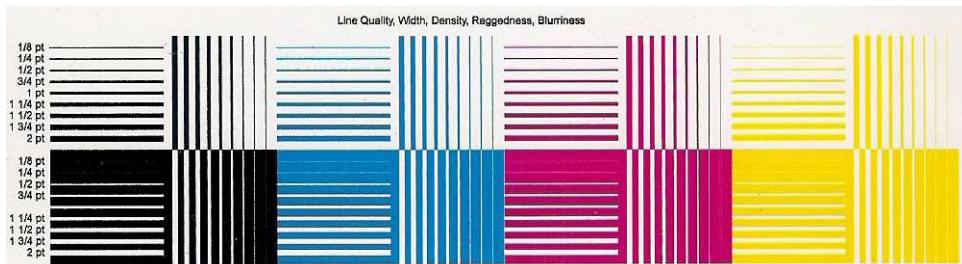
* Color gamut is the size of the color space within which a printing system is capable of reaching



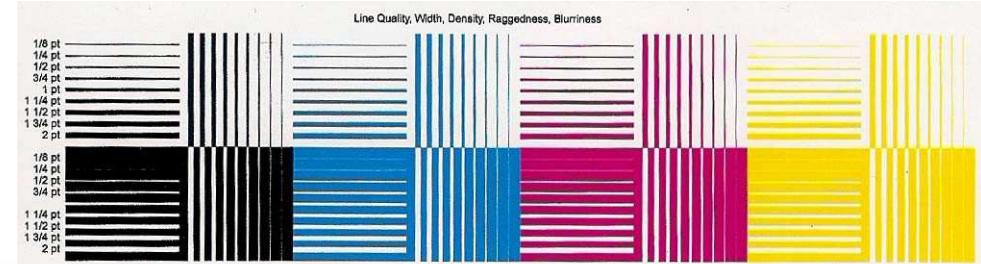
Measurements:	Line Quality*
Instrument:	QEA Personal PIAS-II

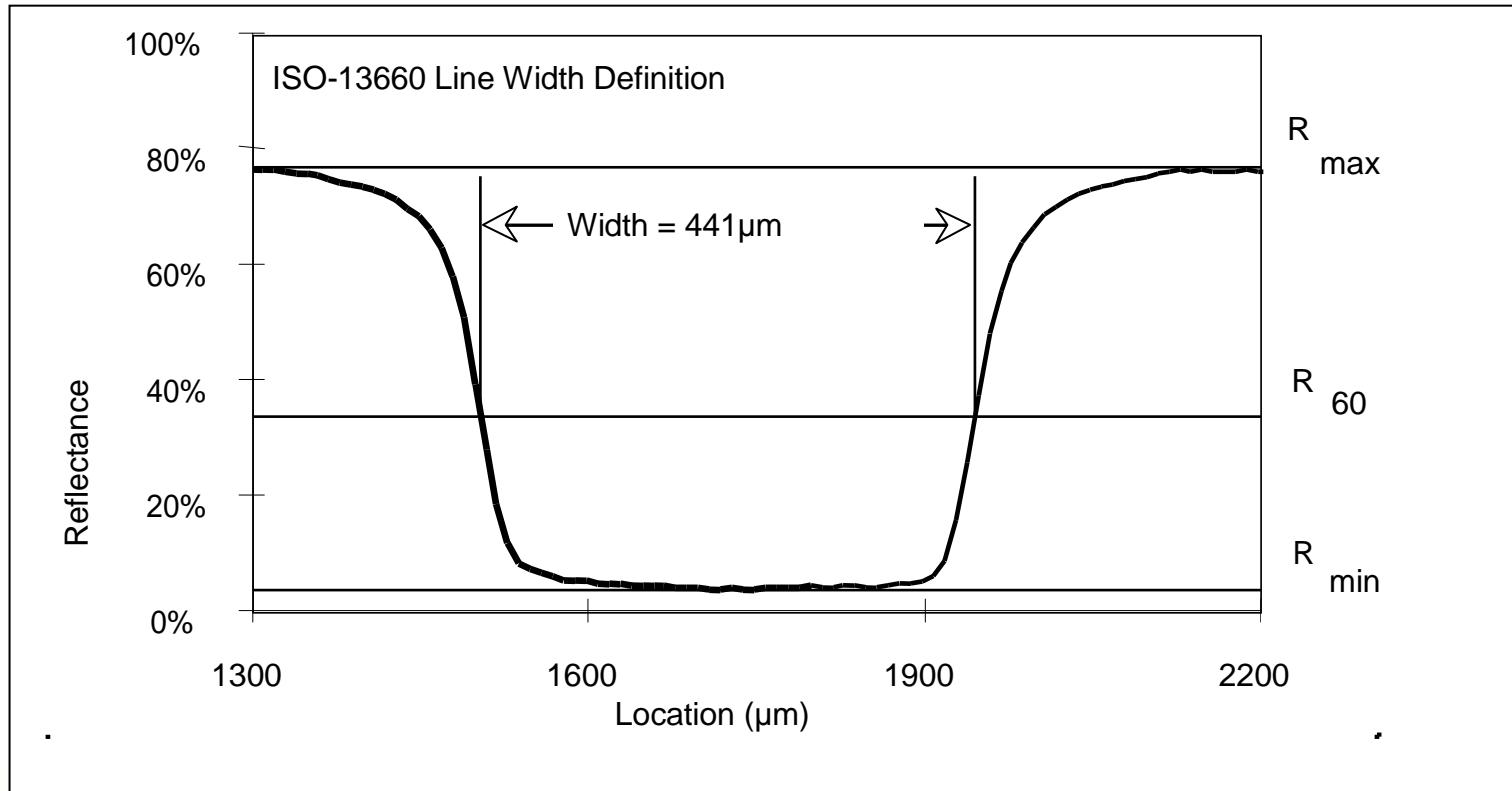
- Line Quality Metrics include: width, blurriness, raggedness, line density, contrast and fill.
- The above metrics are computed based on the ISO-13660 international print quality standard.
- Line quality is fundamental to the reproduction of fine lines, details and resolution in a printing system.

Roland INK

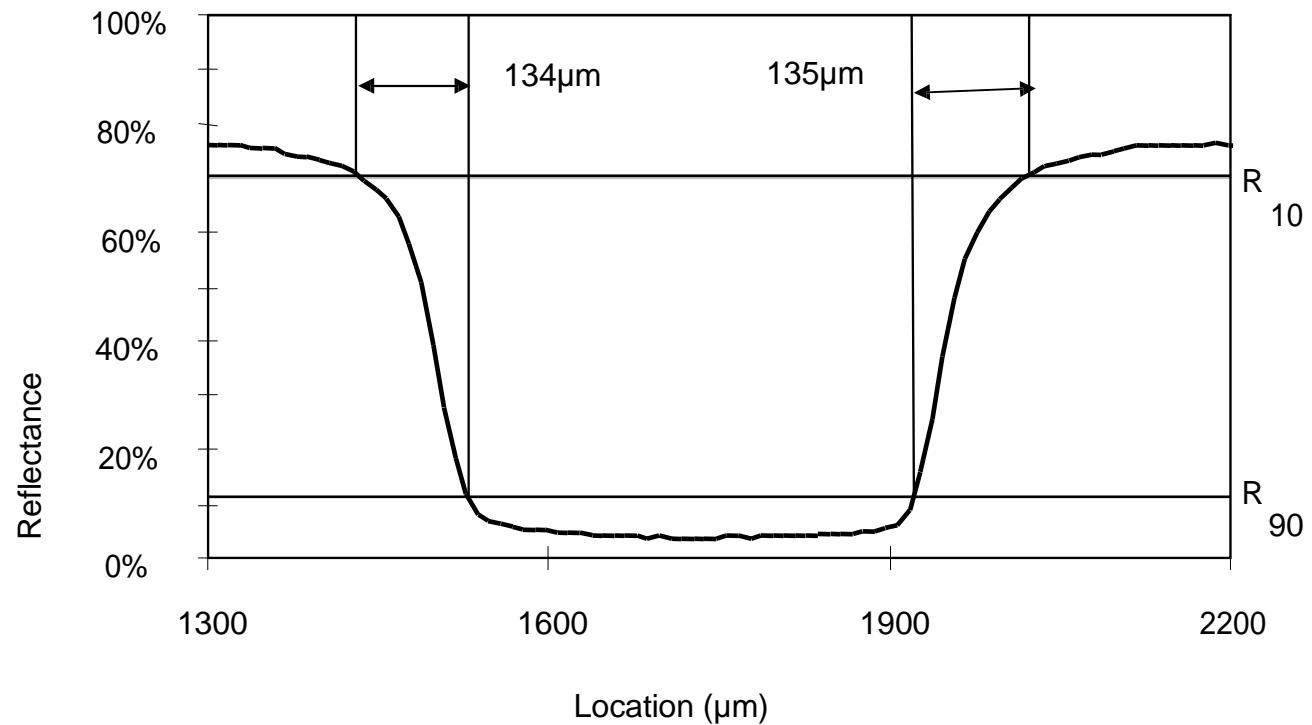


JB eco INK

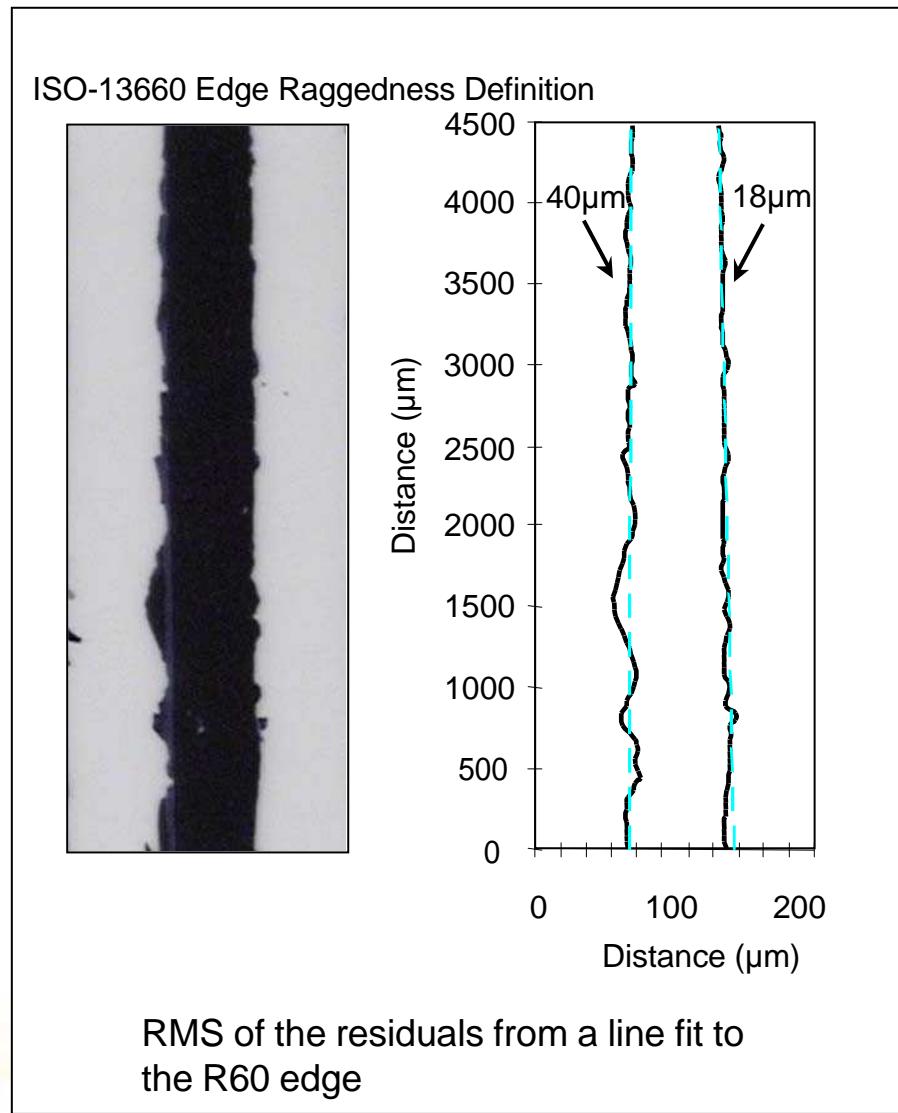
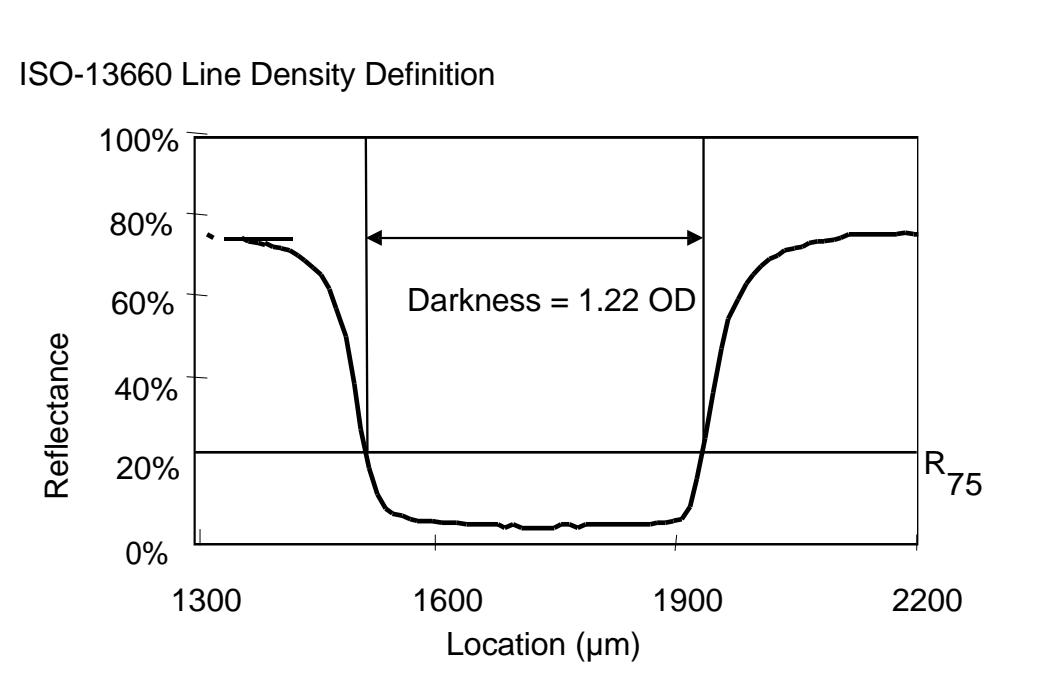




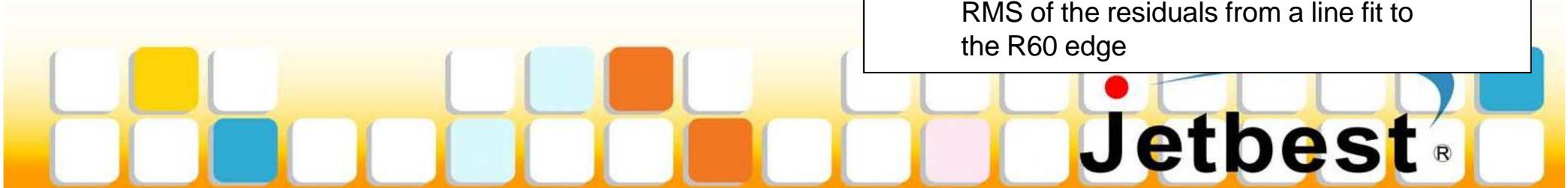
ISO-13660 Edge Blurriness Definition



Line Quality Analysis



RMS of the residuals from a line fit to the R60 edge



Vertical	Target		Measured Line Width (μm)			
	Average Line Width (points)	Average Line Width (μm)	Dark on Light		Light on Dark	
			Roland	JB SS2	Roland	JB SS2
K Average	1.014	357.7	451.9	414.5	267.4	306.6
C Average	1.014	357.7	408.4	403.6	276.5	291.3
M Average	1.014	357.7	392.1	396.9	305.4	300.7
Y Average	1.014	357.7	393.5	400.4	311.8	299.1
All Color Avg.	1.014	357.7	411.5	403.8	290.3	299.4



Vertical	Target		Blurriness (μm)			
	Average Line Width (points)	Average Line Width (μm)	Dark on Light		Light on Dark	
			Roland	JB eco	Roland	JB eco
K Average	1.014	357.7	80.5	89.1	96.3	89.5
C Average	1.014	357.7	97.0	91.0	106.2	89.1
M Average	1.014	357.7	110.1	112.0	106.2	112.0
Y Average	1.014	357.7	103.3	110.2	96.2	103.5
<i>All Color Avg.</i>	<i>1.014</i>	<i>357.7</i>	<i>97.7</i>	<i>100.6</i>	<i>101.2</i>	<i>98.5</i>



Vertical	Target		Raggedness (μm)			
	Average Line Width (points)	Average Line Width (μm)	Dark on Light		Light on Dark	
			Roland	JB eco	Roland	JB eco
K Average	1.014	357.7	4.1	4.5	3.6	6.2
C Average	1.014	357.7	2.1	4.9	4.0	3.4
M Average	1.014	357.7	3.7	3.6	4.4	6.5
Y Average	1.014	357.7	4.9	3.3	3.0	4.7
<i>All Color Avg.</i>	<i>1.014</i>	<i>357.7</i>	<i>3.7</i>	<i>4.1</i>	<i>3.7</i>	<i>5.2</i>



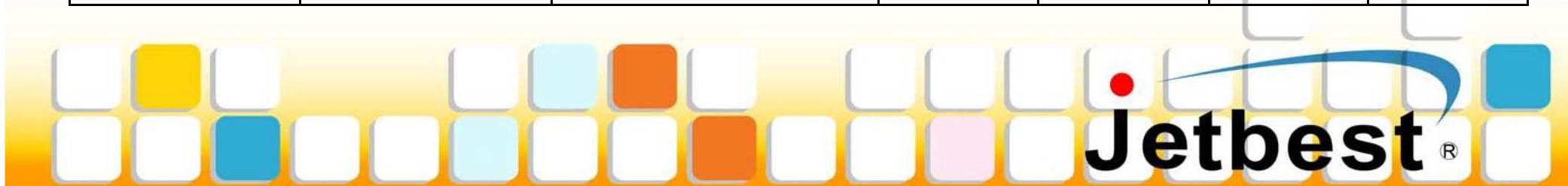
Vertical	Target		Density (OD)			
	Average Line Width (points)	Average Line Width (μm)	Dark on Light		Light on Dark	
			Roland	JB eco	Roland	JB eco
K Average	1.014	357.7	0.87	0.83	0.21	0.20
C Average	1.014	357.7	0.81	0.79	0.20	0.20
M Average	1.014	357.7	0.63	0.61	0.19	0.19
Y Average	1.014	357.7	0.58	0.58	0.18	0.18
All Color Avg.	1.014	357.7	0.72	0.70	0.19	0.19



Vertical	Target		Contrast			
	Average Line Width (points)	Average Line Width (μm)	Dark on Light		Light on Dark	
			Roland	JB eco	Roland	JB eco
K Average	1.014	357.7	0.82	0.80	0.91	0.91
C Average	1.014	357.7	0.80	0.79	0.89	0.88
M Average	1.014	357.7	0.70	0.68	0.79	0.78
Y Average	1.014	357.7	0.62	0.67	0.75	0.75
All Color Avg.	1.014	357.7	0.73	0.73	0.83	0.83

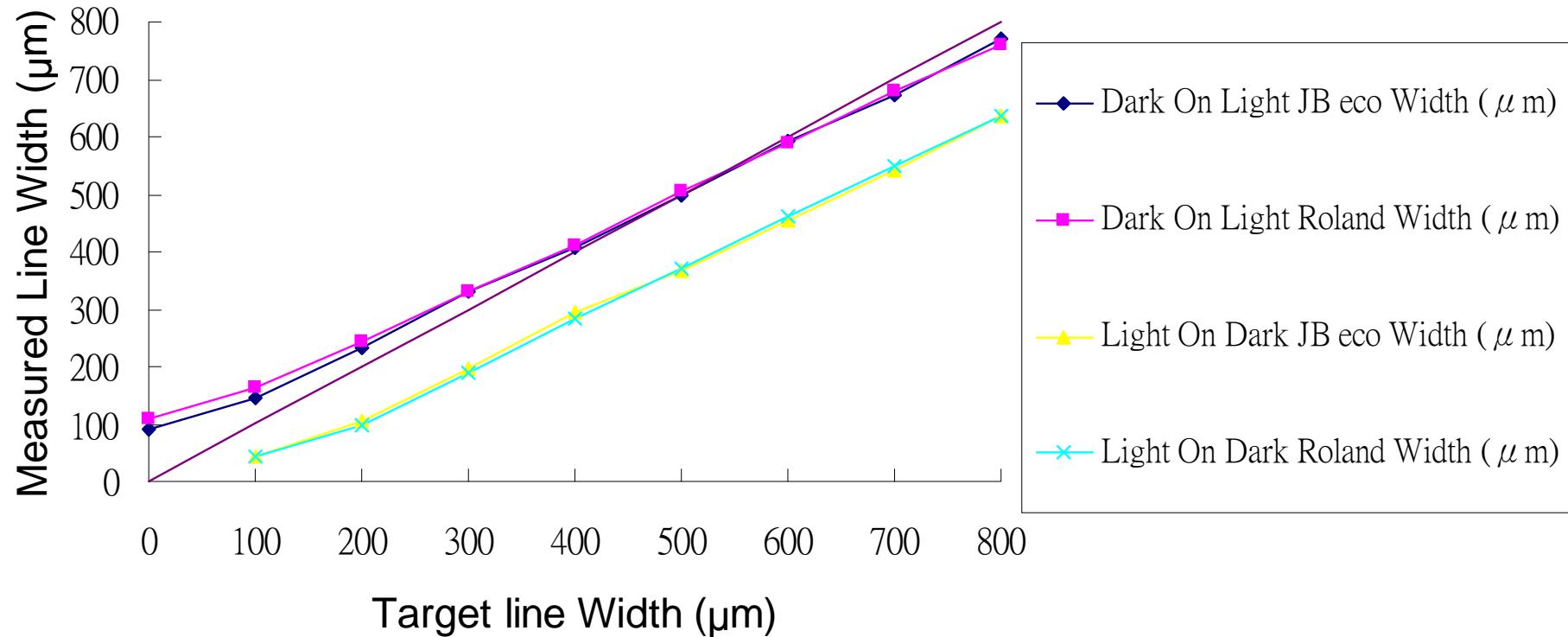


Vertical	Target		Fill			
	Average Line Width (points)	Average Line Width (μm)	Dark on Light		Light on Dark	
			Roland	JB eco	Roland	JB eco
K Average	1.014	357.7	1.000	1.000	1.000	1.000
C Average	1.014	357.7	1.000	1.000	1.000	1.000
M Average	1.014	357.7	1.000	1.000	1.000	1.000
Y Average	1.014	357.7	1.000	1.000	1.000	1.000
<i>All Color Avg.</i>	<i>1.014</i>	<i>357.7</i>	<i>1.000</i>	<i>1.000</i>	<i>1.000</i>	<i>1.000</i>



Vertical

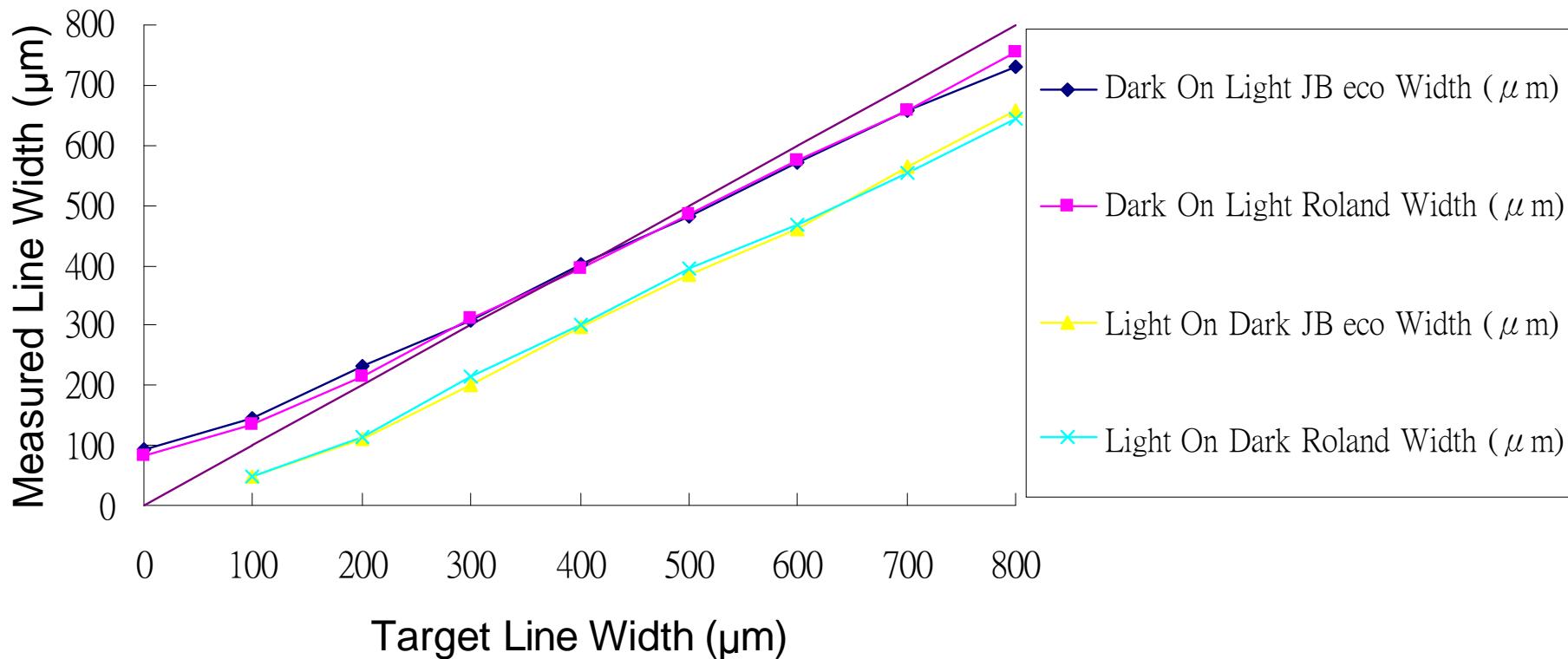
CYAN



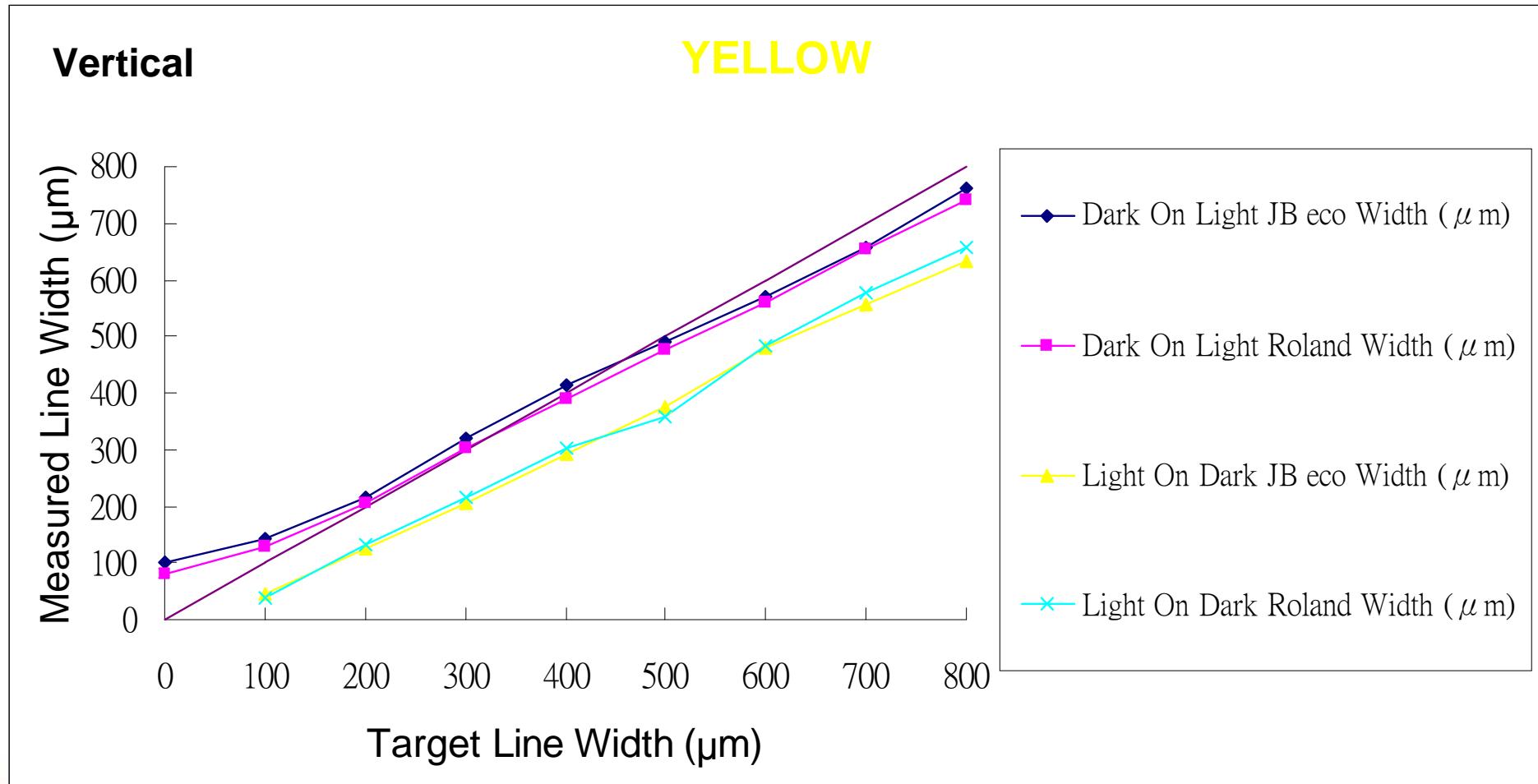
Line Quality Analysis Summary

Vertical

MAGENTA

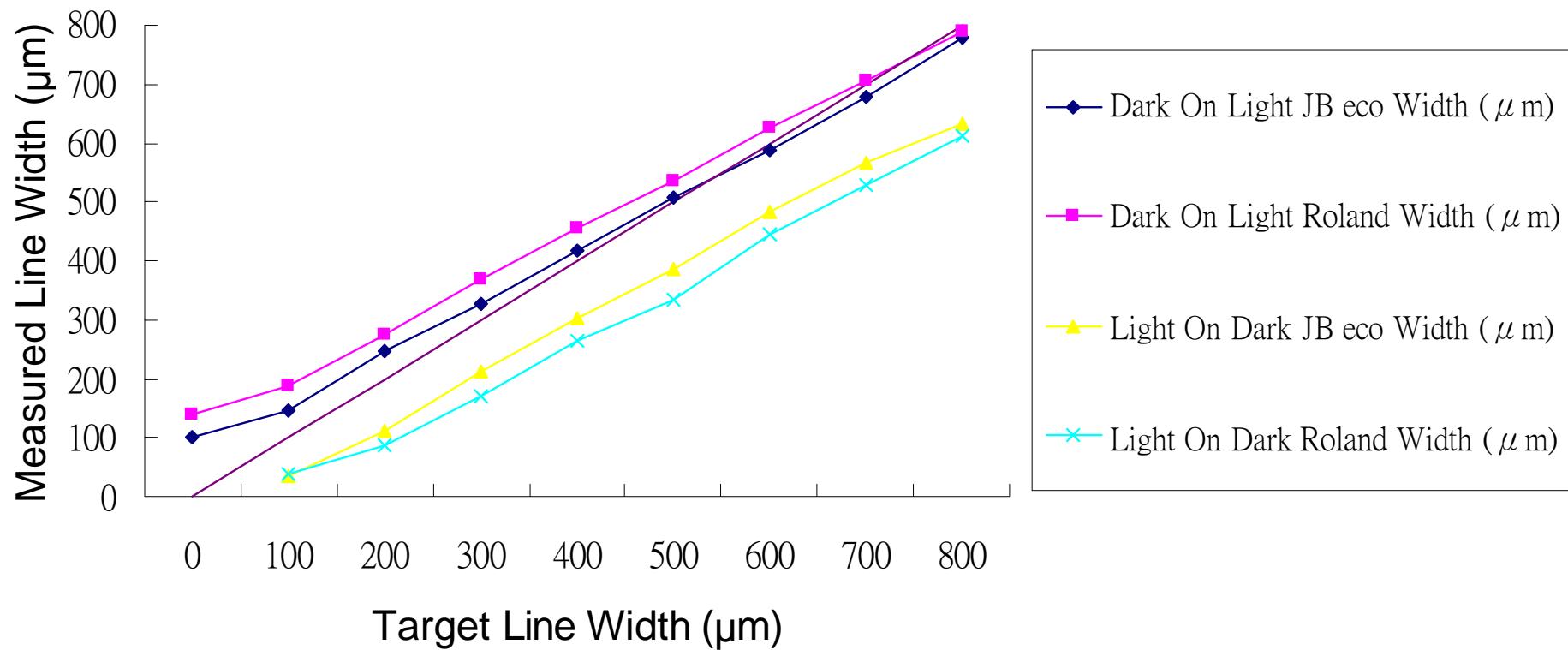


Line Quality Analysis Summary

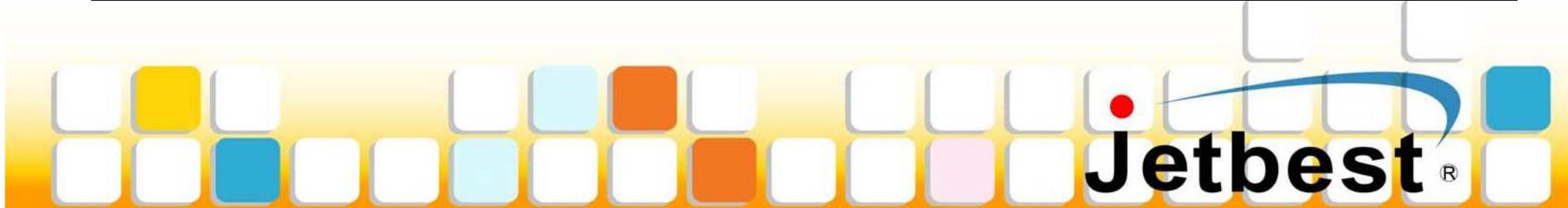


Vertical

BLACK



Horizontal	Target		Measured Line Width (μm)			
	Average Line Width (points)	Average Line Width (μm)	Dark on Light		Light on Dark	
			Roland	JB eco	Roland	JB eco
K Average	1.014	357.7	447.3	454.1	273.8	266.1
C Average	1.014	357.7	435.0	448.0	249.7	276.1
M Average	1.014	357.7	405.2	426.1	261.7	275.5
Y Average	1.014	357.7	433.4	406.9	262.6	370.1
All Color Avg.	1.014	357.7	430.2	433.8	262.0	297.0



Horizontal	Target		Blurriness (μm)			
	Average Line Width (points)	Average Line Width (μm)	Dark on Light		Light on Dark	
			Roland	JB eco	Roland	JB eco
K Average	1.014	357.7	122.2	138.0	89.1	109.8
C Average	1.014	357.7	126.3	150.5	112.7	114.0
M Average	1.014	357.7	151.5	170.1	157.6	168.5
Y Average	1.014	357.7	165.3	136.7	143.6	137.4
All Color Avg.	1.014	357.7	141.3	148.8	125.7	132.4



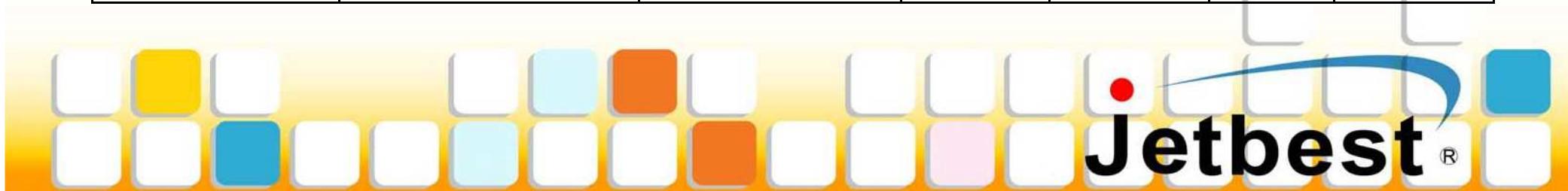
Horizontal	Target		Raggedness (μm)			
	Average Line Width (points)	Average Line Width (μm)	Dark on Light		Light on Dark	
			Roland	JB eco	Roland	JB eco
K Average	1.014	357.7	4.1	10.2	5.1	5.9
C Average	1.014	357.7	7.0	12.2	3.1	10.1
M Average	1.014	357.7	5.6	8.2	3.6	11.5
Y Average	1.014	357.7	4.2	4.9	7.8	6.6
All Color Avg.	1.014	357.7	5.2	8.9	4.9	8.5



Horizontal	Target		Density (OD)			
	Average Line Width (points)	Average Line Width (μm)	Dark on Light		Light on Dark	
			Roland	JB eco	Roland	JB eco
K Average	1.014	357.7	0.88	0.89	0.20	0.21
C Average	1.014	357.7	0.83	0.86	0.20	0.20
M Average	1.014	357.7	0.64	0.67	0.19	0.19
Y Average	1.014	357.7	0.68	0.64	0.19	0.18
All Color Avg.	1.014	357.7	0.76	0.77	0.20	0.20



Horizontal	Target		Contrast			
	Average Line Width (points)	Average Line Width (µm)	Dark on Light		Light on Dark	
			Roland	JB eco	Roland	JB eco
K Average	1.014	357.7	0.84	0.84	0.91	0.91
C Average	1.014	357.7	0.81	0.83	0.88	0.89
M Average	1.014	357.7	0.72	0.74	0.79	0.78
Y Average	1.014	357.7	0.68	0.72	0.75	0.78
<i>All Color Avg.</i>	<i>1.014</i>	<i>357.7</i>	<i>0.76</i>	<i>0.78</i>	<i>0.83</i>	<i>0.84</i>

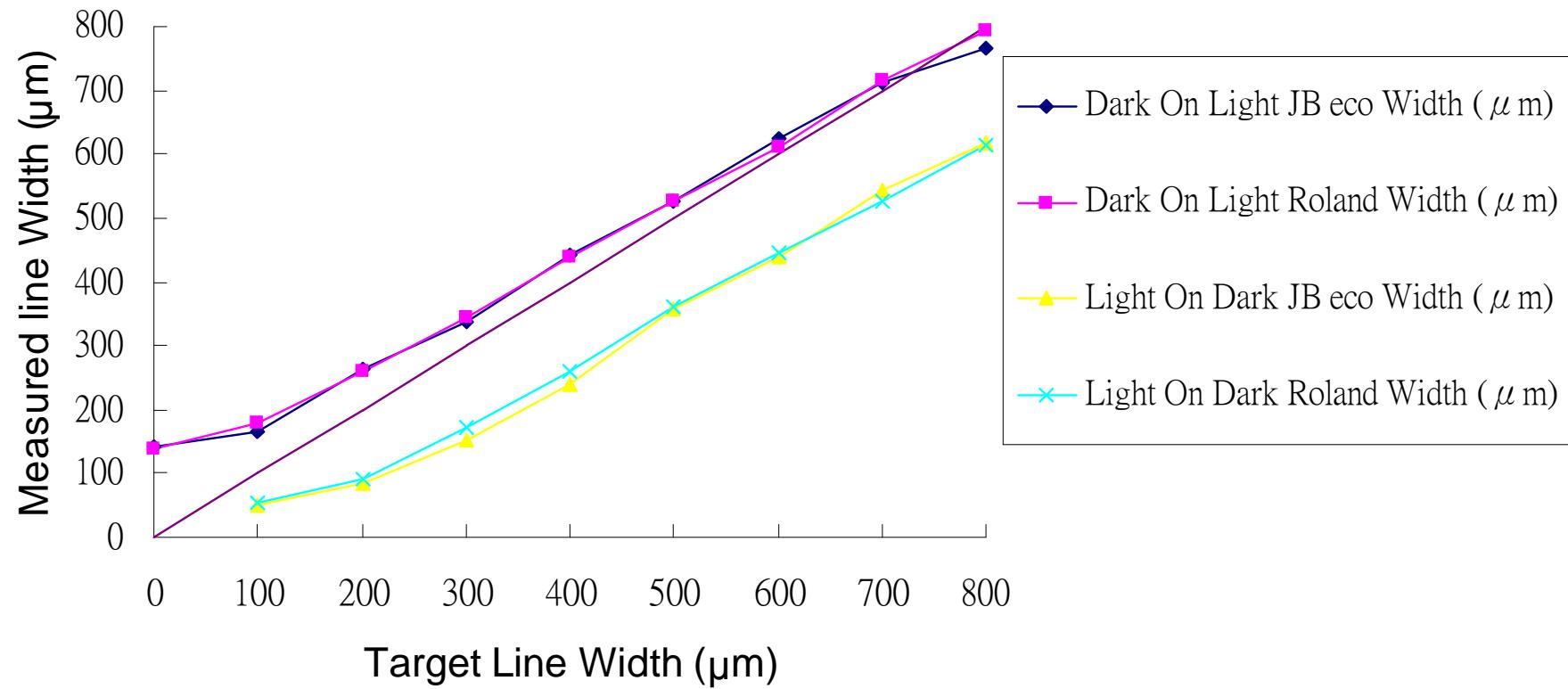


Horizontal	Target		Fill			
	Average Line Width (points)	Average Line Width (μm)	Dark on Light		Light on Dark	
			Roland	JB eco	Roland	JB eco
K Average	1.014	357.7	1.000	1.000	1.000	1.000
C Average	1.014	357.7	1.000	1.000	1.000	1.000
M Average	1.014	357.7	1.000	1.000	1.000	1.000
Y Average	1.014	357.7	1.000	1.000	1.000	1.000
<i>All Color Avg.</i>	<i>1.014</i>	<i>357.7</i>	<i>1.000</i>	<i>1.000</i>	<i>1.000</i>	<i>1.000</i>

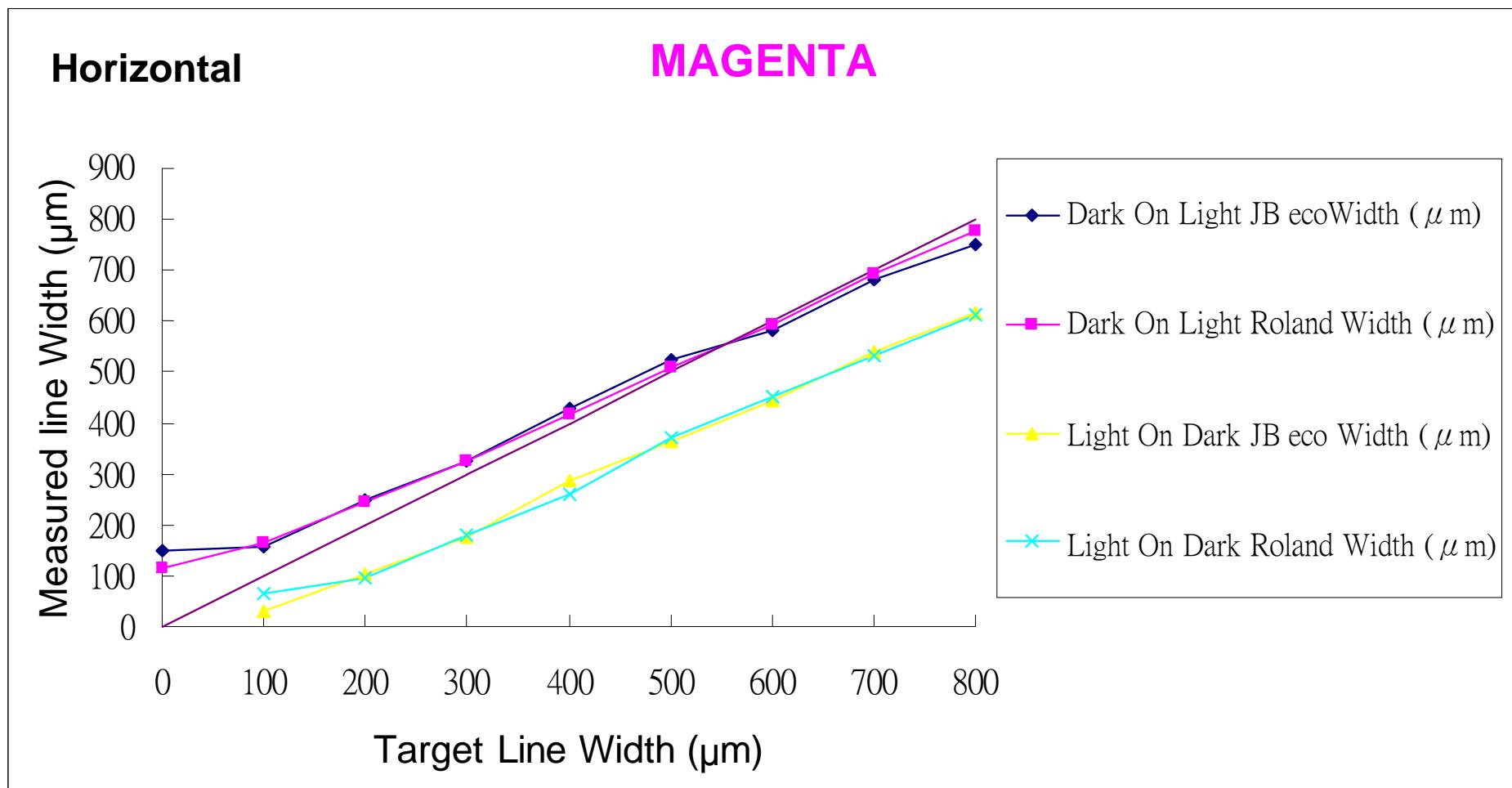


Horizontal

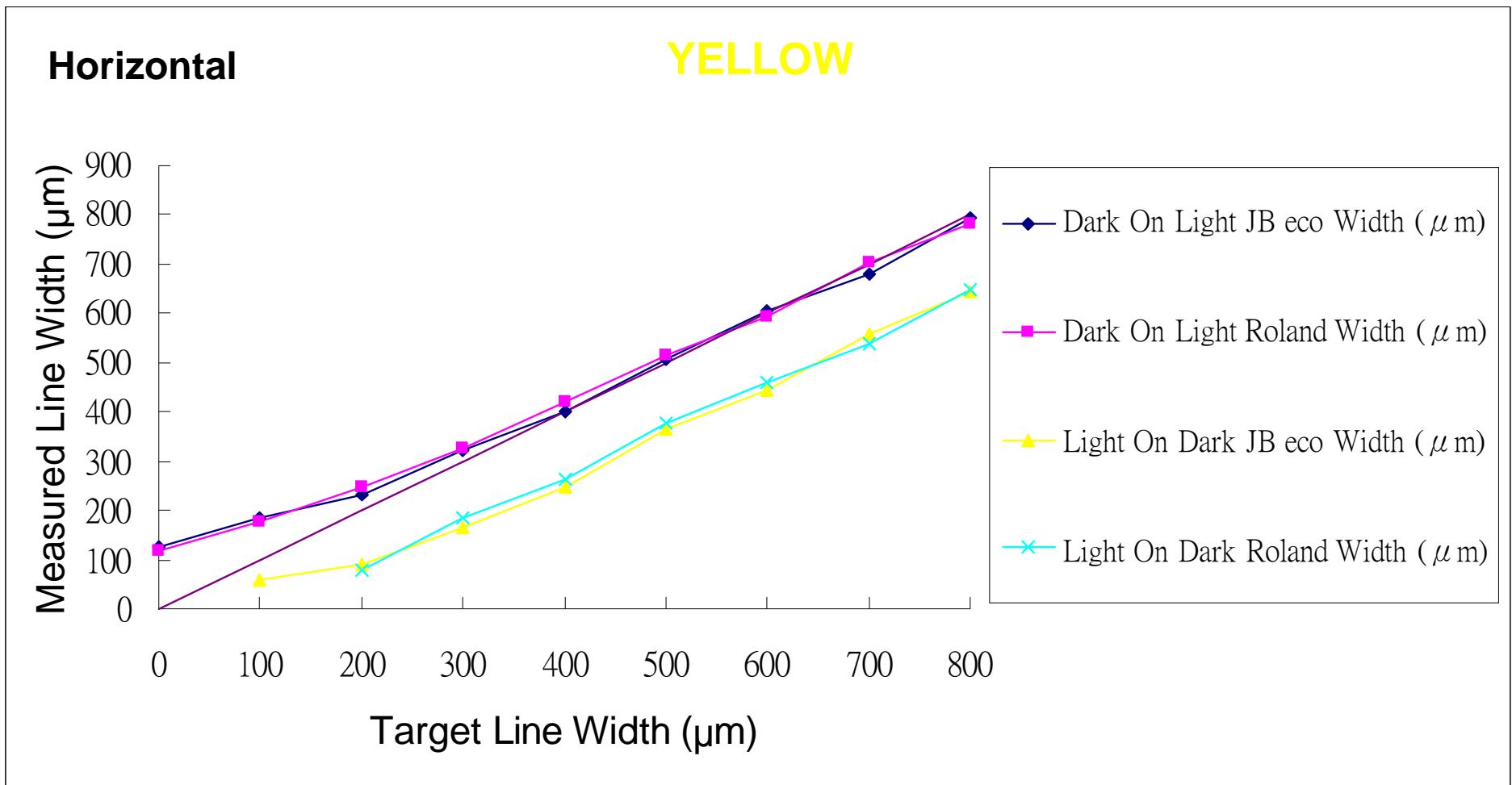
CYAN



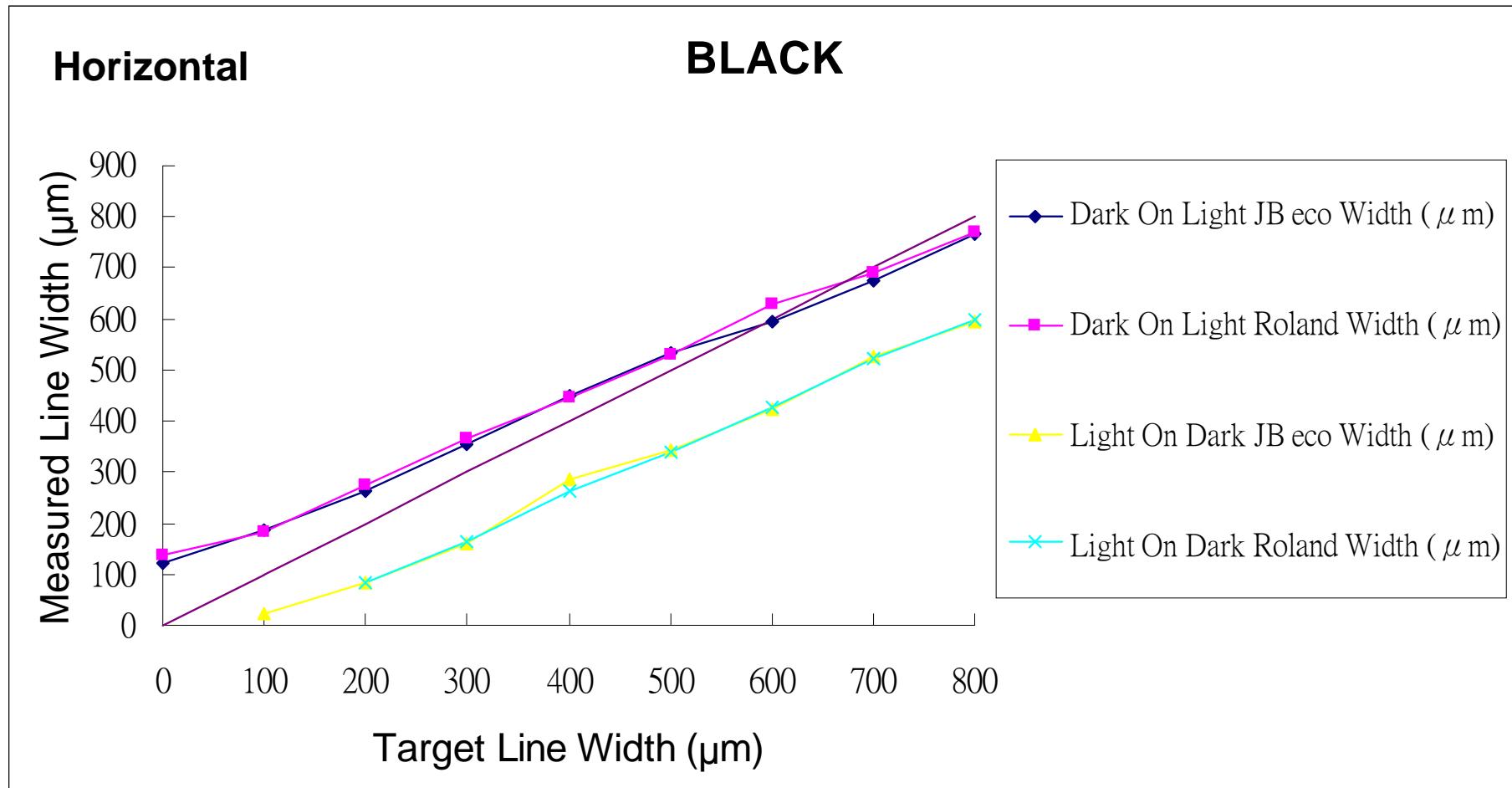
Line Quality Analysis Summary



Line Quality Analysis Summary



Line Quality Analysis Summary



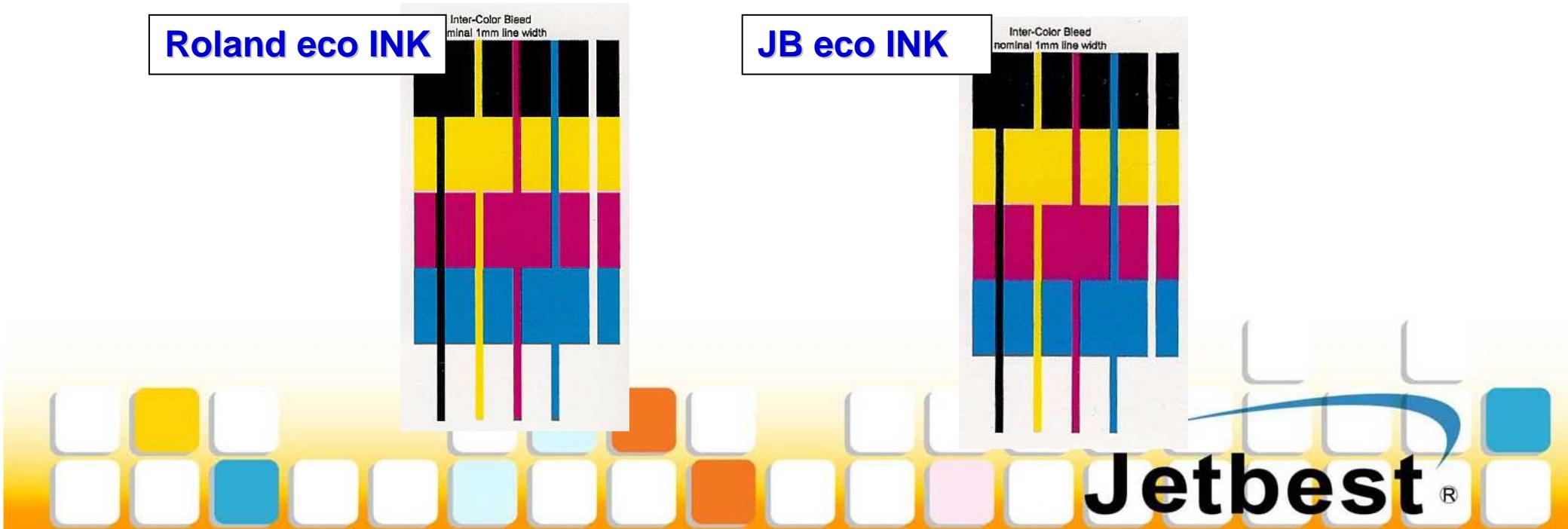
These results again suggest that the line quality for the two ink types are very similar.



Intercolor Bleed*

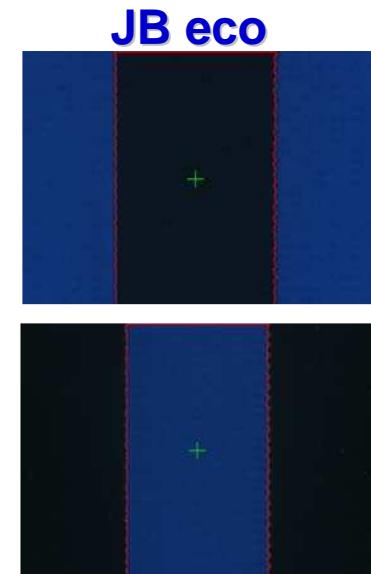
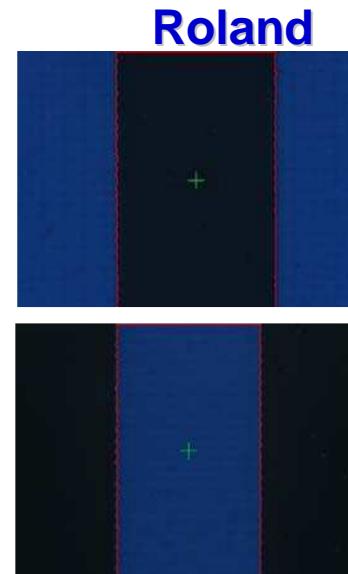
Measurements:	Intercolor Bleed
Instrument:	Personal PIAS-II

- Intercolor bleed in inkjet printing is measured by means of the line quality tool.
- The ICB between two colors can be obtained by the difference in line width of one color on another and vice versa.
- **The Intercolor Bleed between Black and MY appears to be lower in JB eco ink than the Roland ecosolmax ink by about 6~40%. Bleeding between Black and CW to be higher in JB eco ink than the Roland ecosolmax ink by about 20~26%.**

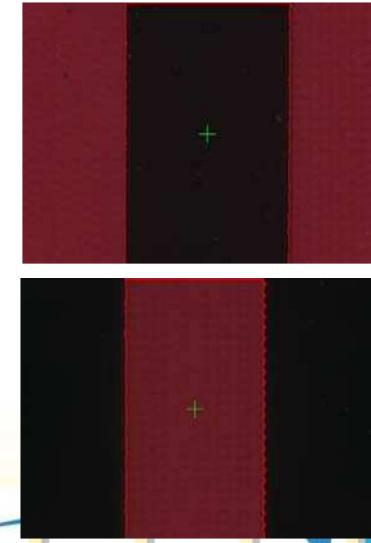
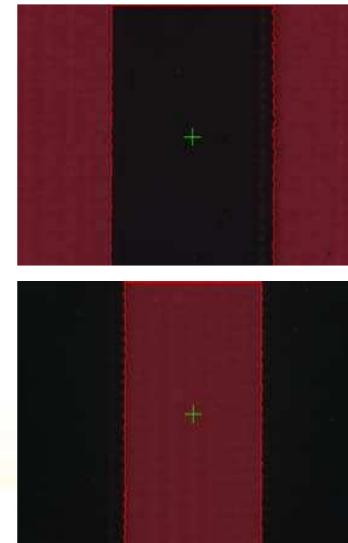


Intercolor Bleed

1440 x 1440 dpi		Line Width (μm)	
Line Color	Field Color	Roland	JB eco
Black	Cyan	1083.2	1091.8
Cyan	Black	976.0	963.6
	ICB ((μm))	107.2	128.2



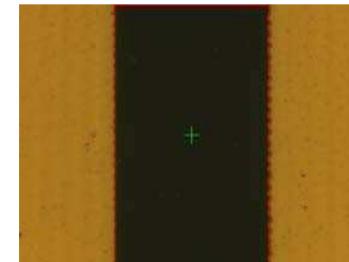
1440 x 1440 dpi		Line Width (μm)	
Line Color	Field Color	Rolan	JB eco
Black	Magenta	1105.4	1102.0
Magenta	Black	913.6	922.2
	ICB ((μm))	191.8	179.8



Intercolor Bleed

1440 x 1440 dpi	Line Width (μm)		
Line Color	Field Color	Rolan	JB eco
Black	Yellow	1099.3	1078.8
Yellow	Black	938.4	965.9
	ICB ((μm)	160.9	112.9

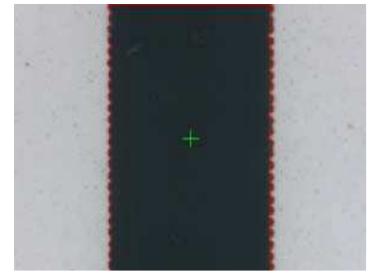
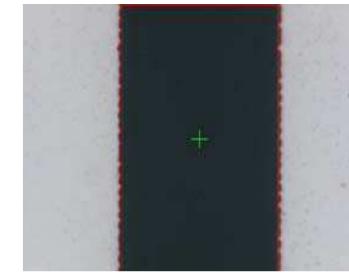
Roland



JB eco



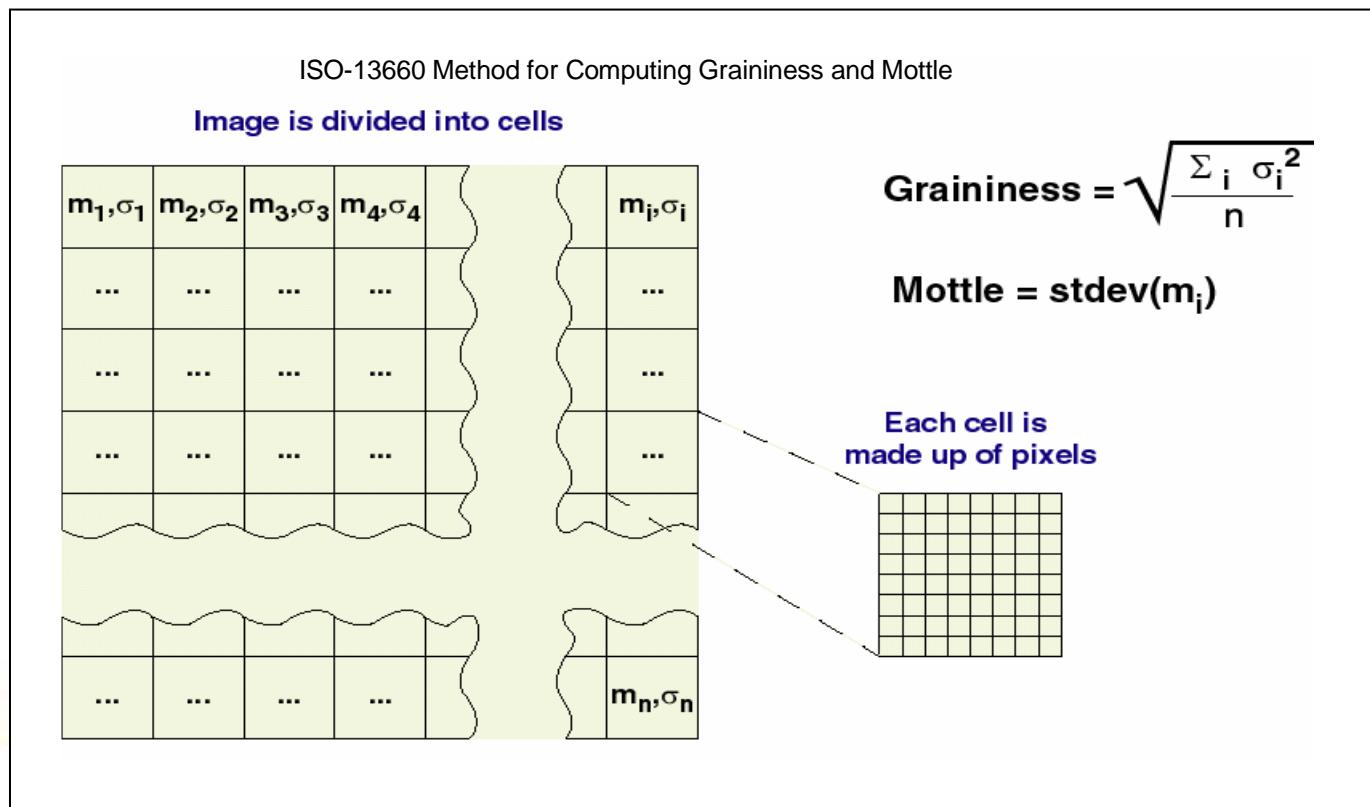
1440 x 1440 dpi	Line Width (μm)		
Line Color	Field Color	Rolan	JB eco
Black	White	1072.8	1097.8
White	Black	963.5	959.7
	ICB ((μm)	109.3	138.1



Graininess and Mottle

Measurements:	Area Properties*
Instrument:	Personal PIAS-II

*Area properties include: graininess, mottle, reflectance, density and L*a*b* estimation.
Graininess and mottle are computed using the ISO-13660 algorithm.



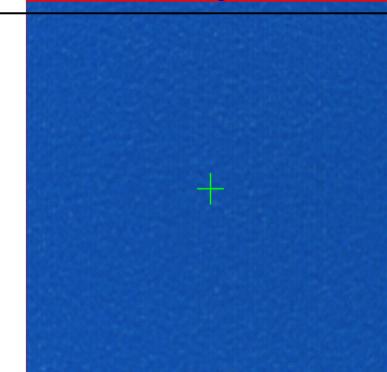
Jetbest®

Graininess and Mottle

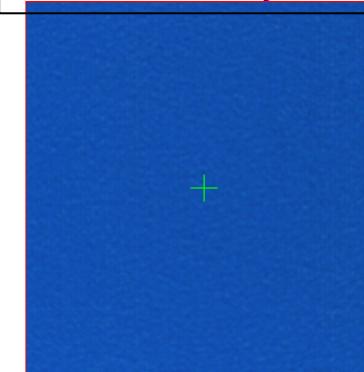
Graininess & Mottle

- Graininess and mottle are measurements of the non-uniformity in color. Both appears as "noise" in the color field, with graininess of smaller scale and mottle of larger scale.
- **The mottle for the two ink types are quite similar, with Roland ecosolmax ink slightly higher in graininess than JB eco ink.**

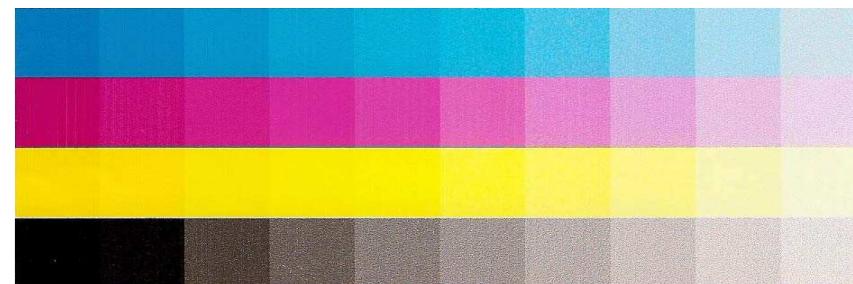
Roland INK, Cyan 80%



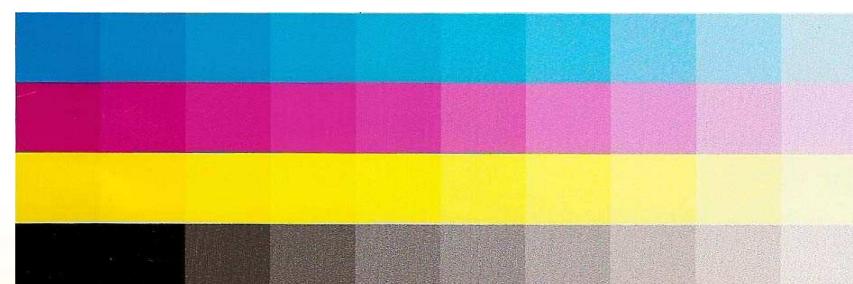
JB eco INK, Cyan 80%



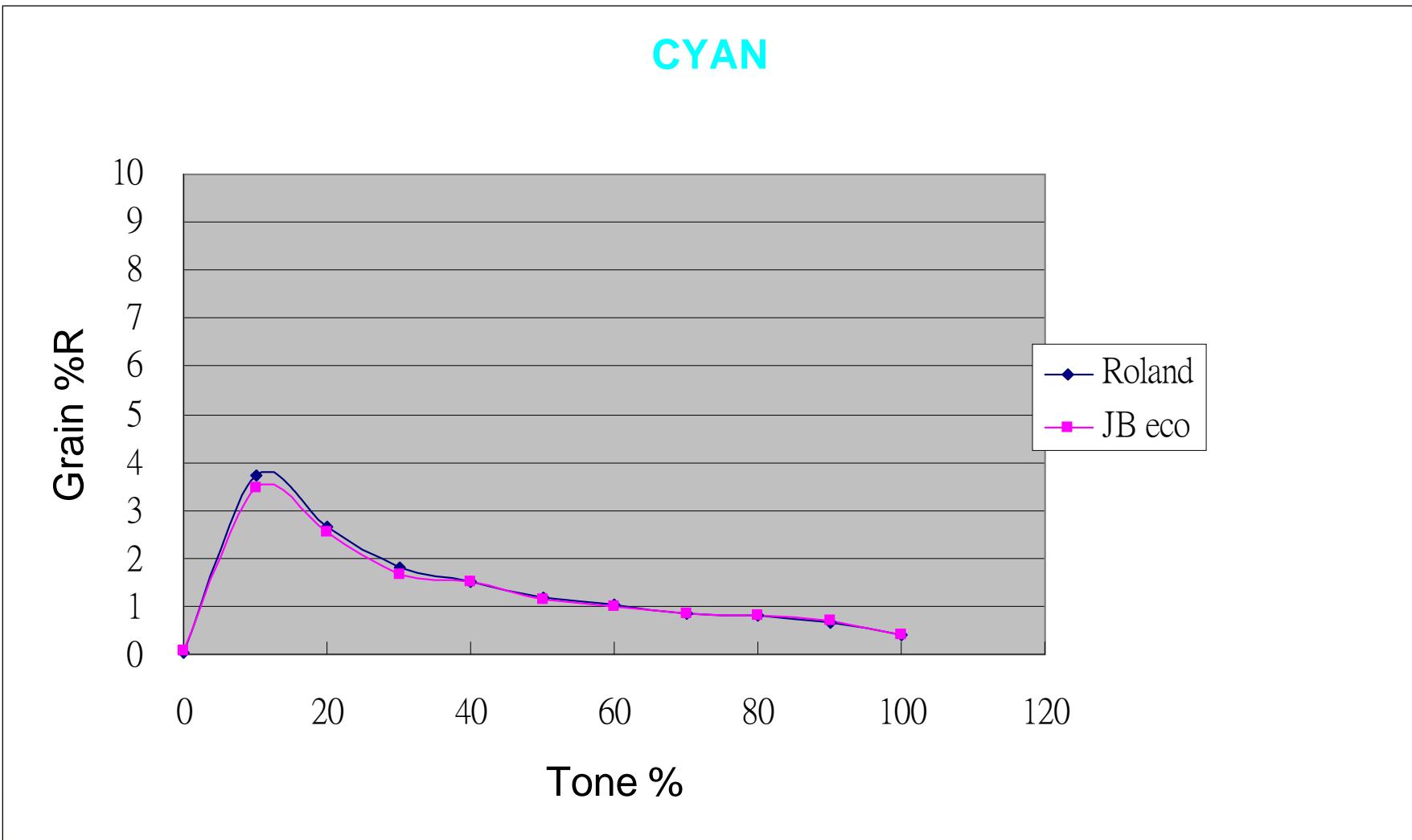
Roland INK



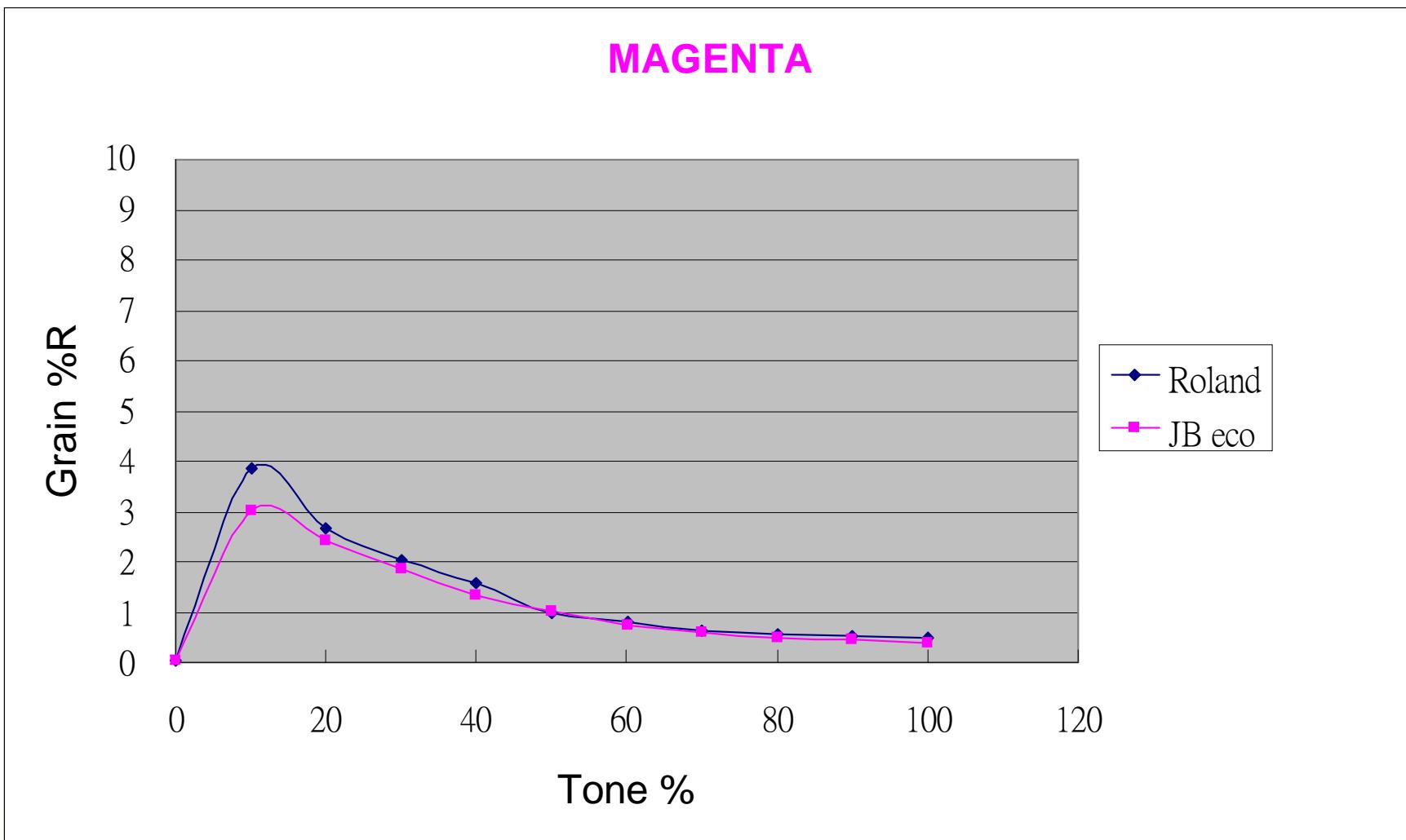
JB eco INK



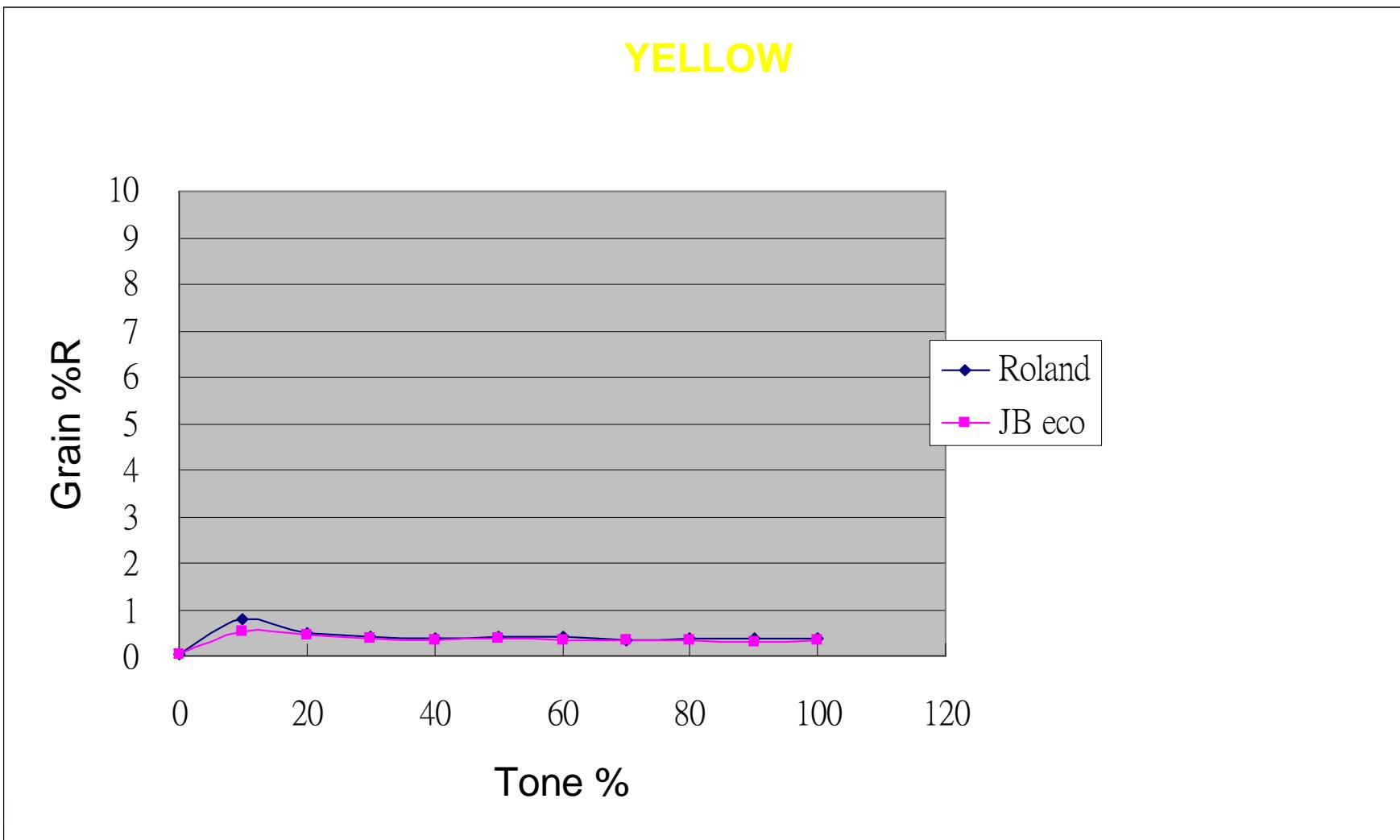
Graininess and Mottle



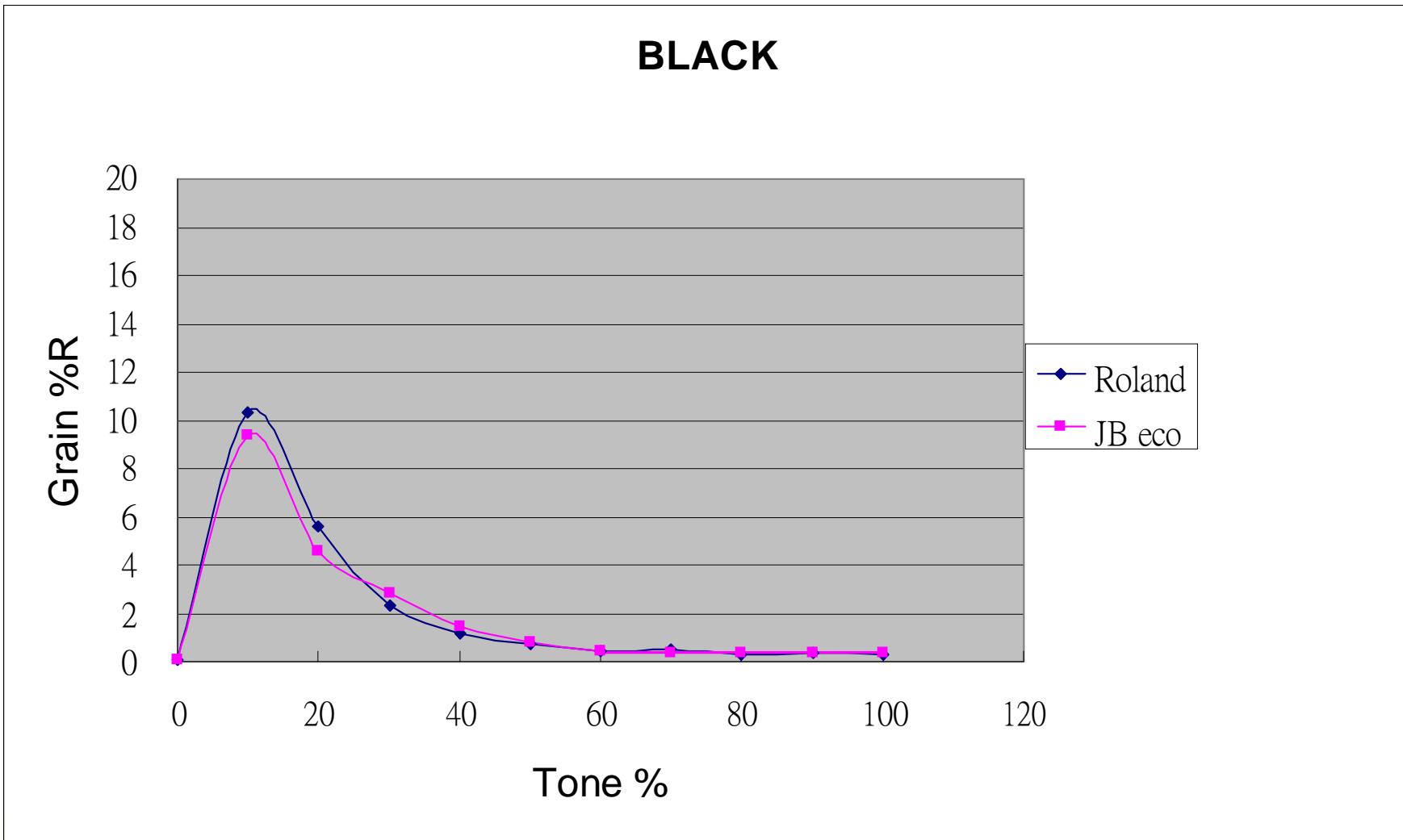
Graininess and Mottle



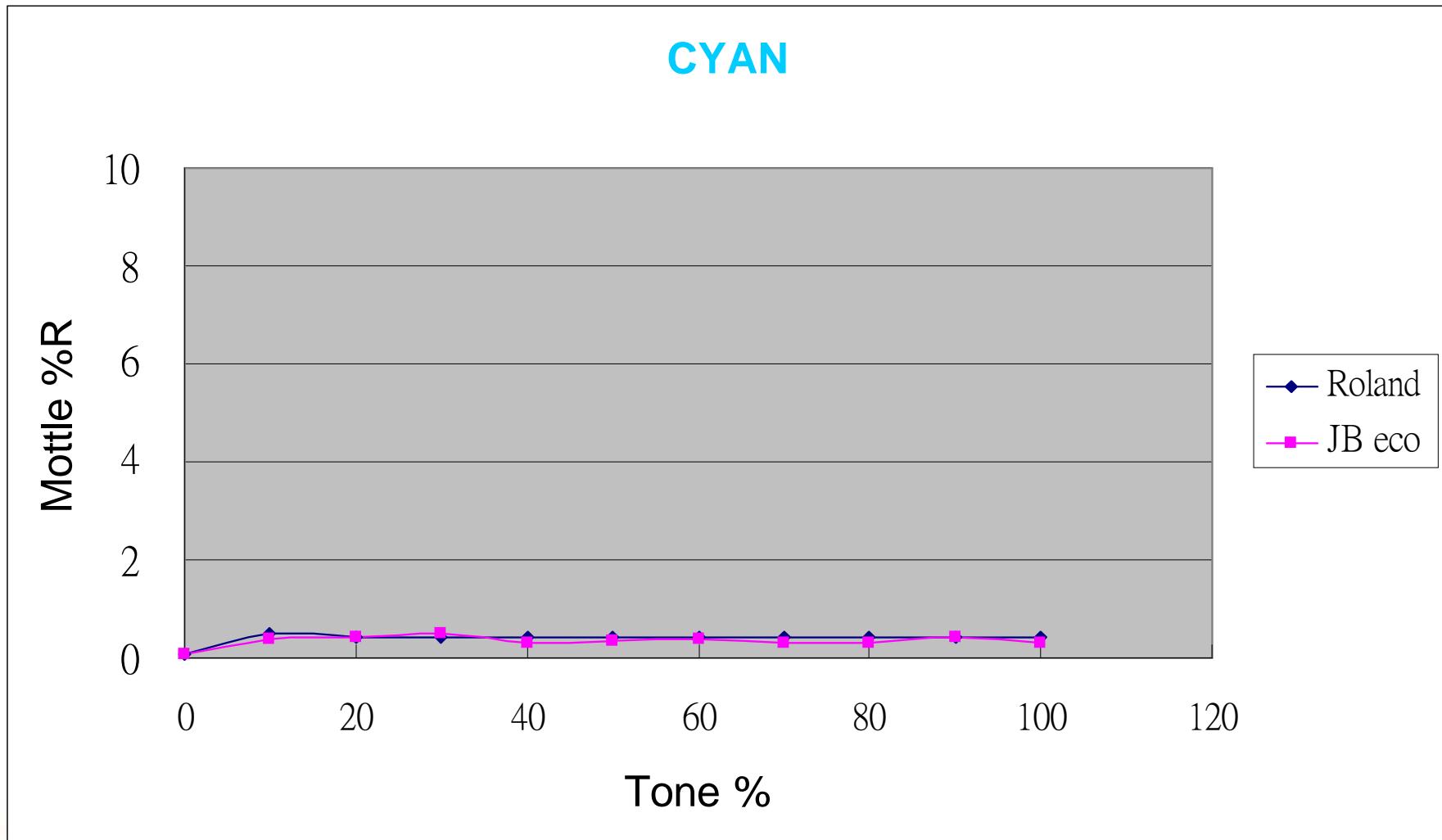
Graininess and Mottle



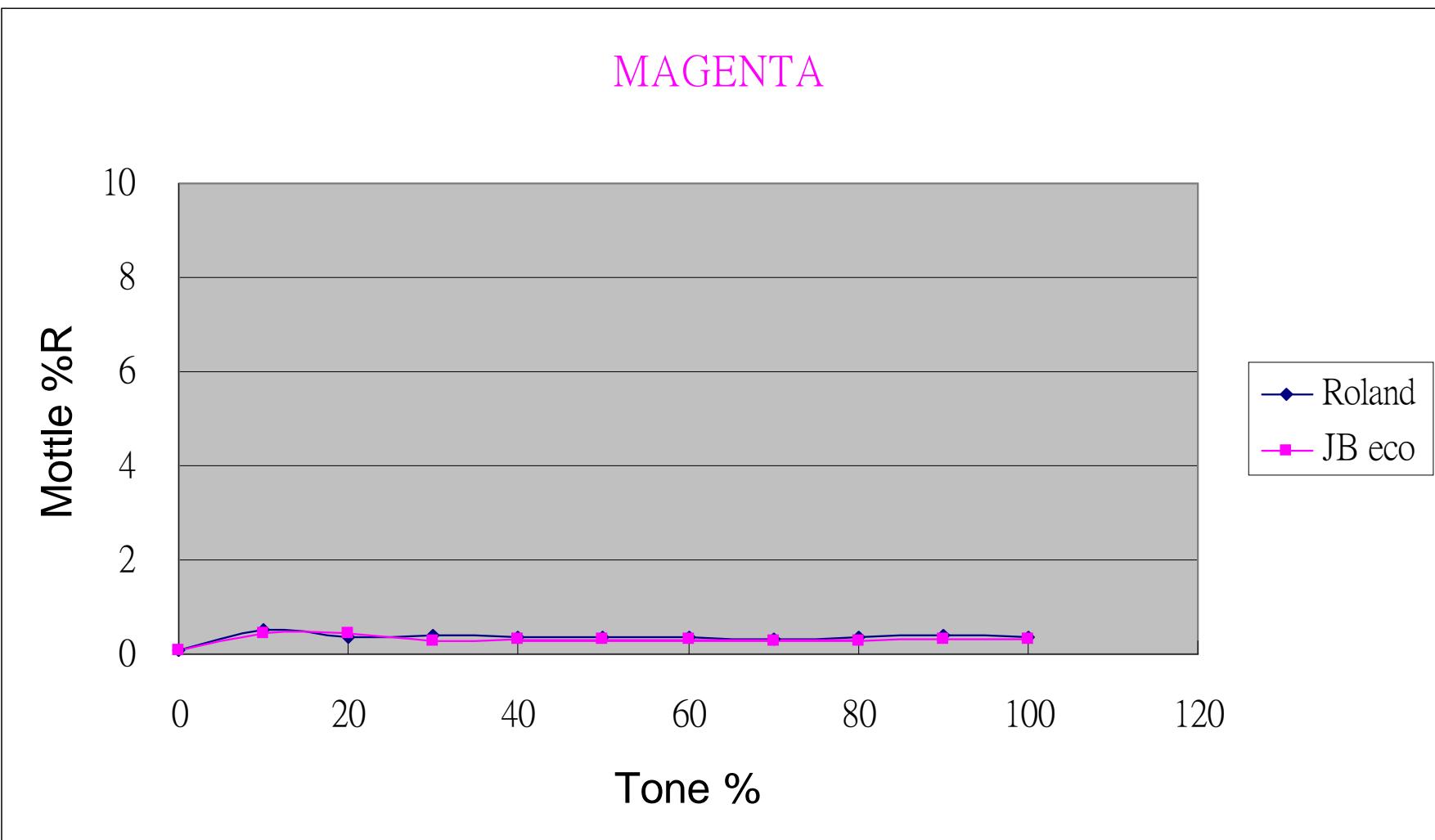
Graininess and Mottle



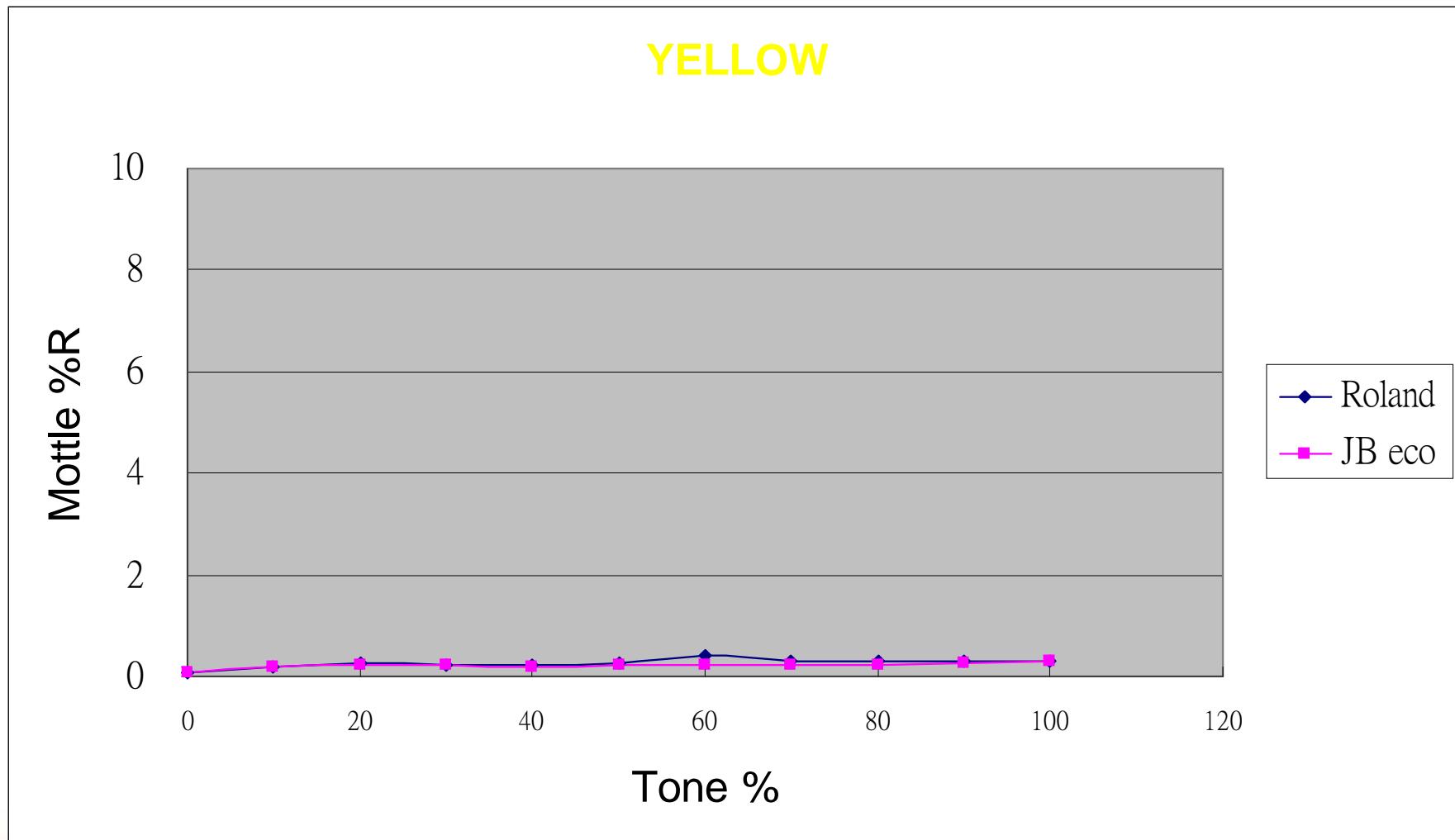
Graininess and Mottle



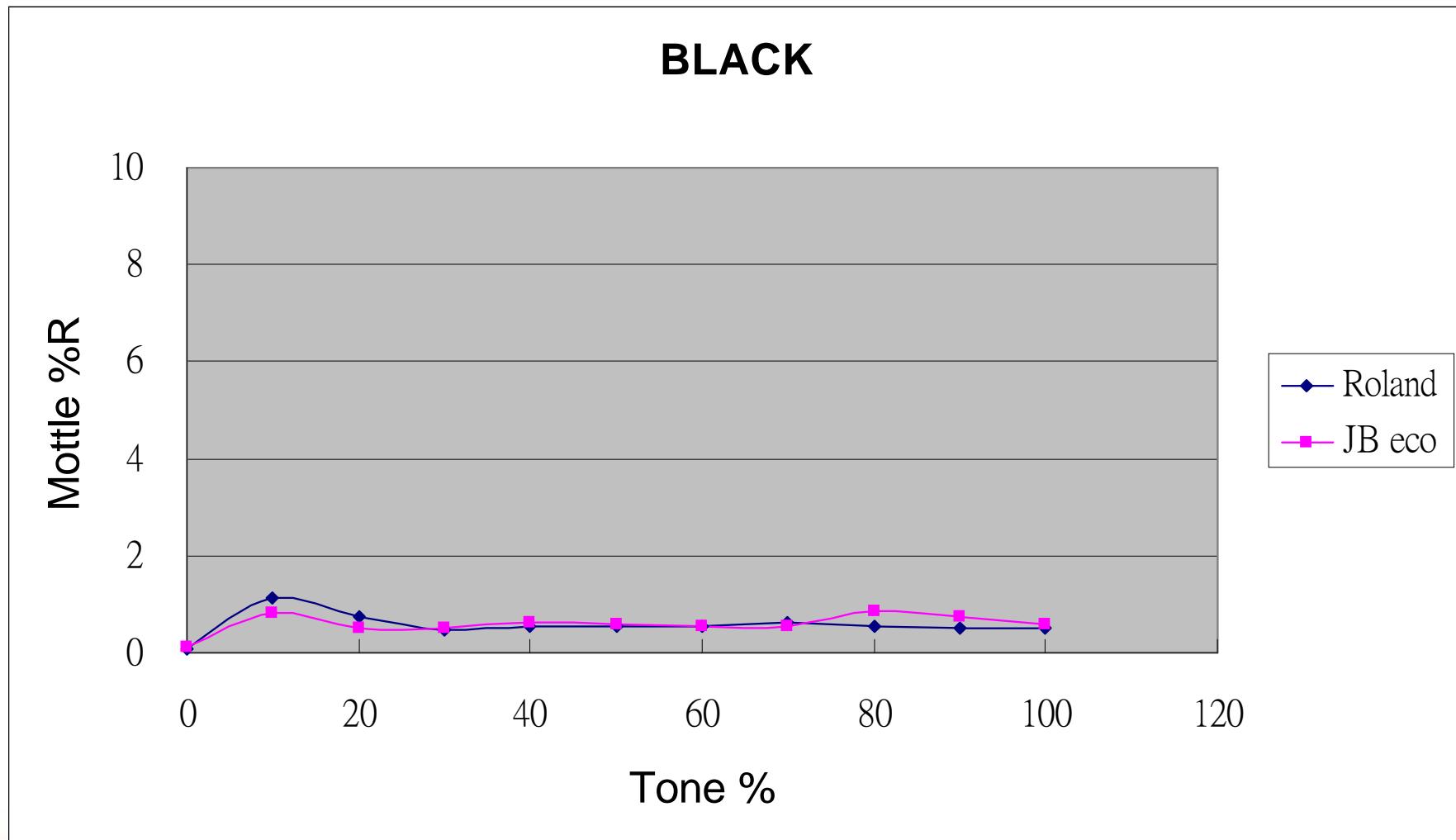
Graininess and Mottle



Graininess and Mottle



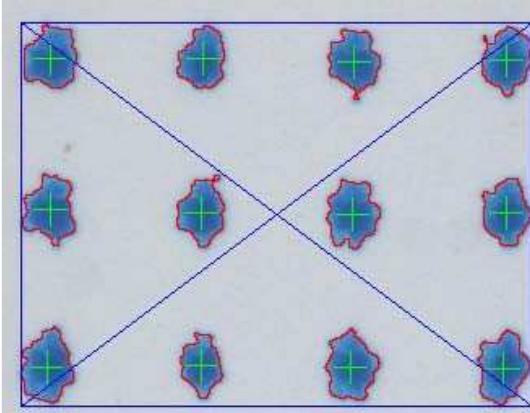
Graininess and Mottle



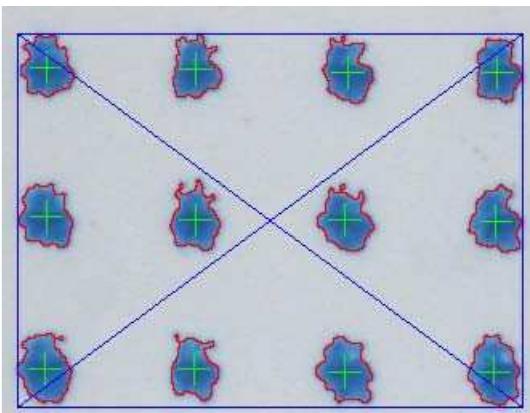
Dot Analysis

Measurements:	Area Properties*
Instrument:	Personal PIAS-II

Roland INK



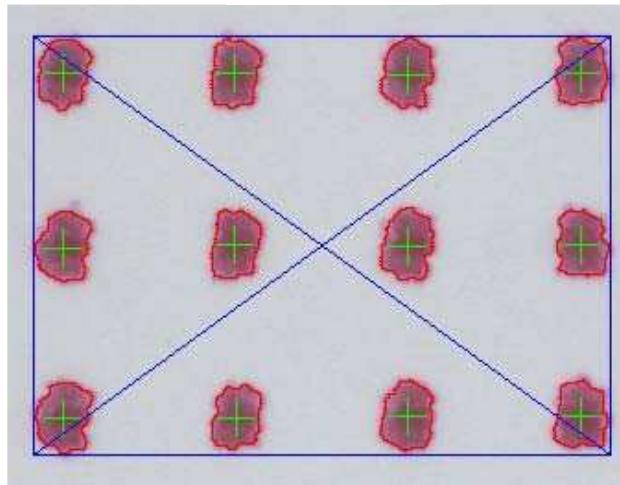
JB eco INK



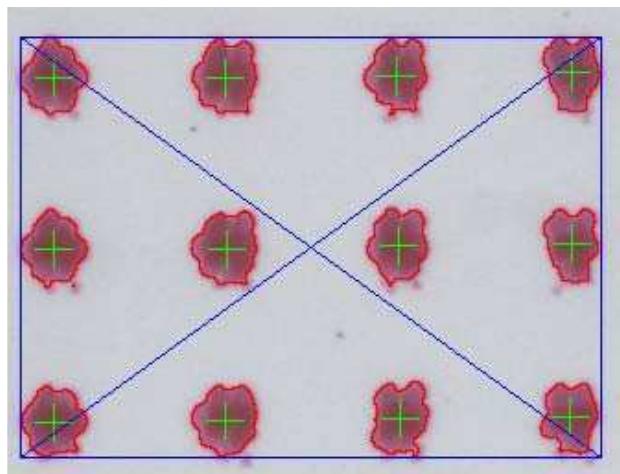
Dot Summary	Mean	Min	Max	Stdv
Count	12			
Area (μm^2)	28961.56	21988.89	33040.45	2875.025
Diameter (μm)	191.778	167.323	205.106	9.8
Perimeter (μm)	730.134	637.998	790.209	46.709
BoxRatio	1.377	1.243	1.519	0.085
Circularity	1.471	1.298	1.664	0.116

Dot Summary	Mean	Min	Max	Stdv
Count	12			
Area (μm^2)	29475.58	26586.56	33126.12	1915.478
Diameter (μm)	193.624	183.987	205.372	6.278
Perimeter (μm)	771.614	681.283	868.37	47.996
BoxRatio	1.299	1.167	1.464	0.107
Circularity	1.618	1.323	2.064	0.208

Dot Analysis

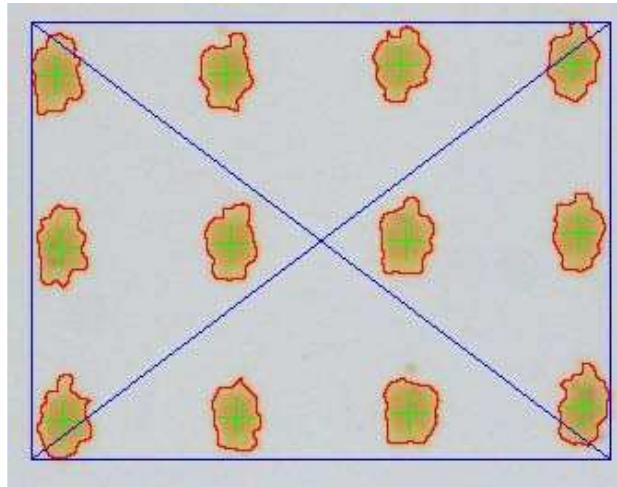


JB eco INK



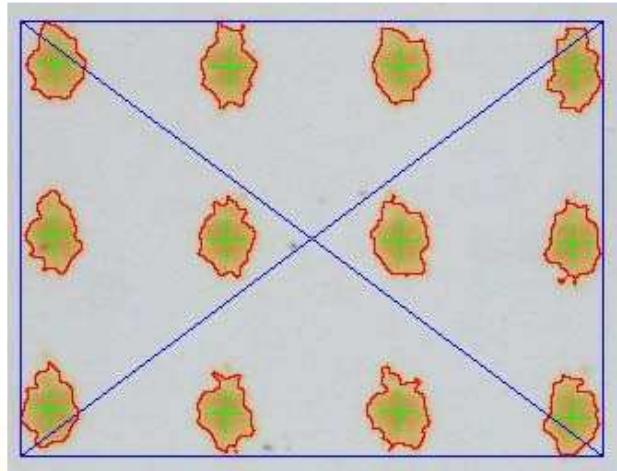
Dot Summary	Mean	Min	Max	Stdv
Count	12			
Area (μm^2)	26512.79	23930.76	28214.31	1038.605
Diameter (μm)	183.695	174.555	189.535	3.631
Perimeter (μm)	681.774	637.998	719.826	19.84
BoxRatio	1.274	1.182	1.345	0.053
Circularity	1.396	1.32	1.462	0.043

Dot Summary	Mean	Min	Max	Stdv
Count	12			
Area (μm^2)	30534.57	27671.73	33468.8	1799.624
Diameter (μm)	197.089	187.704	206.431	5.825
Perimeter (μm)	729.191	687.006	778.985	33.257
BoxRatio	1.201	1.054	1.367	0.092
Circularity	1.39	1.219	1.615	0.112



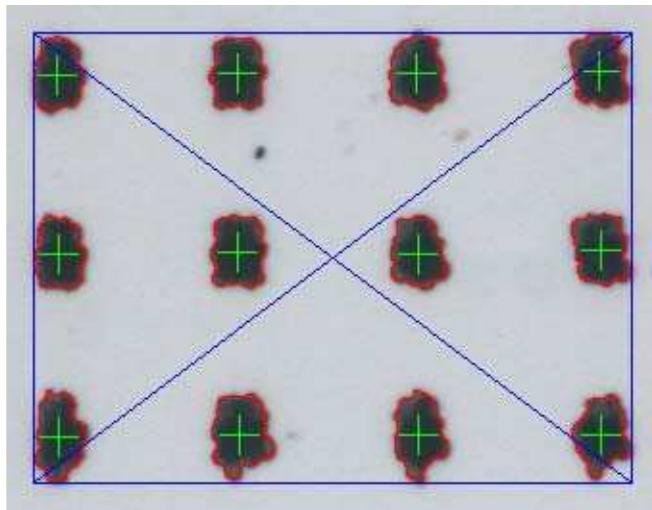
Dot Summary	Mean	Min	Max	Stdv
Count	12			
Area ($\mu\text{ m}^2$)	27386.16	24816.03	28899.68	1029.703
Diameter ($\mu\text{ m}$)	186.699	177.755	191.823	3.546
Perimeter ($\mu\text{ m}$)	698.043	627.848	741.737	32.858
BoxRatio	1.47	1.161	1.643	0.129
Circularity	1.418	1.227	1.546	0.101

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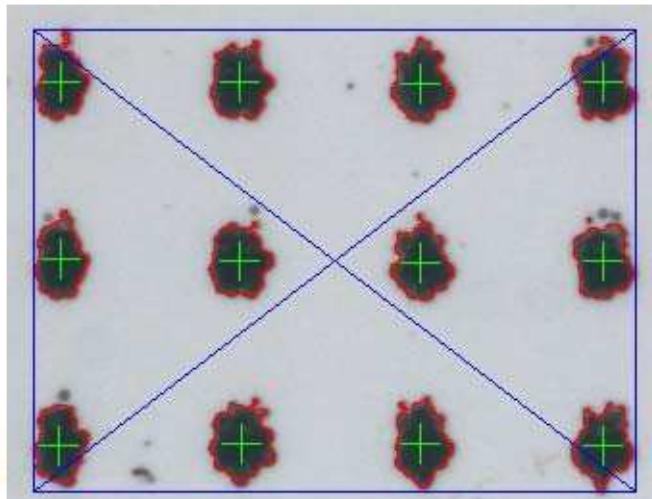
Dot Summary	Mean	Min	Max	Stdv
Count	12			
Area ($\mu\text{ m}^2$)	28409.45	26986.36	30870.11	965.099
Diameter ($\mu\text{ m}$)	190.163	185.365	198.255	3.203
Perimeter ($\mu\text{ m}$)	762.314	683.339	880.891	56.983
BoxRatio	1.424	1.273	1.549	0.079
Circularity	1.636	1.311	2.001	0.234





Dot Summary	Mean	Min	Max	Stdv
Count	12			
Area ($\mu\text{ m}^2$)	27816.9	25444.28	31869.61	1524.993
Diameter ($\mu\text{ m}$)	188.127	179.991	201.439	5.092
Perimeter ($\mu\text{ m}$)	678.864	635.404	750.591	32.135
BoxRatio	1.408	1.226	1.778	0.17
Circularity	1.319	1.227	1.438	0.069

JB eco INK



Dot Summary	Mean	Min	Max	Stdv
Count	12			
Area ($\mu\text{ m}^2$)	28573.65	25358.61	31898.17	1670.786
Diameter ($\mu\text{ m}$)	190.656	179.687	201.529	5.603
Perimeter ($\mu\text{ m}$)	734.821	680.746	797.766	30.586
BoxRatio	1.391	1.177	1.679	0.154
Circularity	1.506	1.404	1.657	0.084

The results here show that the dot characteristics for the two ink types are quite similar.