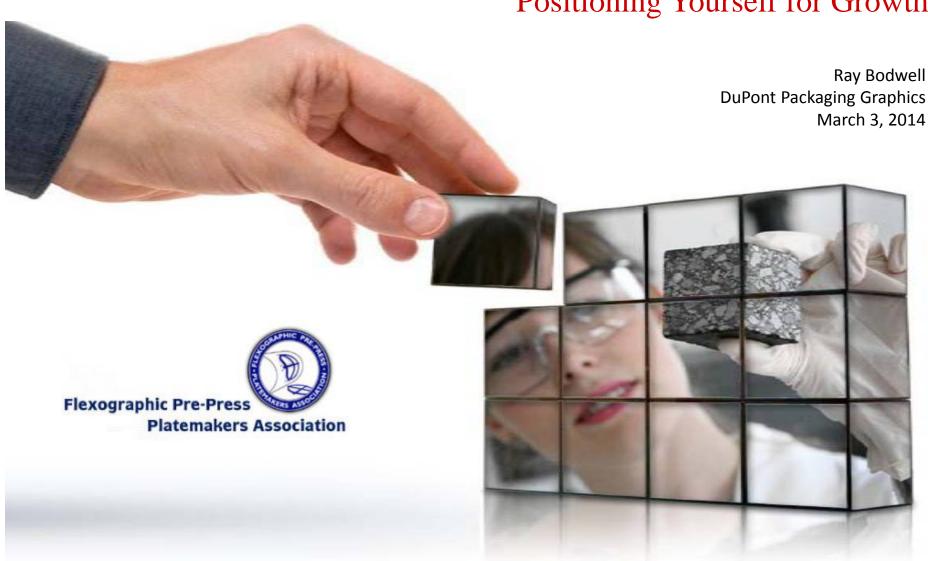


You've Survived . . . Now What?

Positioning Yourself for Growth





Some historical and forecast numbers to put things in perspective





Recent Trends



Flexible Packaging & Corrugated Hard Hit in 2009 - 2010

	2005	2008	2009	Change (%) 2008-09	CAGR (%) 2005-09	2010p	Change (%) 2009-10	2011f	Change (%) 2010-11	2015f	CAGR (% 2011-1
US	61,716	70,231	69,355	-1.2	3.0	67,546	-2.6	68,303	1.1	74,333	4.3
Canada	7,418	9,006	8,081	10	2.2	7,879	7.5	7,980	1.3	8,948	2.9
North America	69,134	79,237	77,435	-2.3	2.9	75,424	-2.6	76,284	1.1	83,281	4.2

Note: current prices and exchange rates 2005–09; constant (2009) prices and exchange rates for 2010–15; p, provisional; f, localist Source: Pira International Ltd

	2005	2008	2009	Change (%) 2008-09	CAGR (%) 2005-09	2010p	Change (%) 2009-10	2011f	Change (%) 2010-11	2015f	CAGR (%) 2011-15
Offset	14,444	16,303	16,012	1.8	2.6	15,613	2.3	15,884	1.7	17,092	1.8
Elexography	32,452	36,257	35,009	-3.4	1.9	33,807	-3.4	33,833	0.1	35,493	1.2
Gravure	6,822	7,783	7,661	4.6	2.9	7,484	23	7,630	1.9	8,267	2.0
Screen	1,197	1,297	1,257	-3.0	1.2	1,233	-2.0	1,222	-0.9	1,027	-4.3
Digital	663	1,323	1,464	10.7	21.9	1,641	12.0	1,960	19.5	3,723	17.4
Others*	13,556	16,275	16,032	-1.5	4.3	15,648	-2.4	15,754	0.7	17,678	2.9
Total	69,134	79,237	77,435	-2.3	2.9	75,424	-2.6	76,284	1.1	83,281	2.2

Note: current prices and exchange rates 2005–09, constant (2009) prices and exchange rates for 2010–15, p, provisional; f, forecast, *mainly dry offset, also letterpress, pad printing, others Source: Pira International Ltd

	2005	2008	2009	Change (%)	CAGR (%)	2010p	Change (%)	2011f	Change (%)	2015f	CAGR (%)
				2008-09	2005-09	2009-10		2010-11			2011-15
Board packaging	35,408	40,393	39,440	-2.4	2.7	38,290	7.3	38,757	1.2	41,007	1.4
Corrugated	24,243	27,466	26,709	-2.8	2.5	25,863	-3.2	26,109	0.9	27,328	1.1
Cartons	11,165	12,927	12,731	1.3	3.3	12,426		12,648	1.8	13,678	2.0
Flexible packaging	11,418	12,935	12,648	-2.2	2.6	12,454	-1.5	12,651	1.6	14,490	3.5
Rigid plastic packaging	5,143	6,224	6,141	13	4.5	6,045	-1.6	6,146	1.7	7,089	3.6
Metal cans	8,227	9,986	9,849	-1.4	4.6	9,593	-2.6	9,635	0.4	10,662	2.6
Labels	8,938	9,699	9,357	-3.5	1.2	9,042	-3.4	9,094	0.6	10,033	2.5
Total	69,134	79,237	77,435	-2.3	2.9	75,424	-2.6	76,284	1.1	83,281	2.2

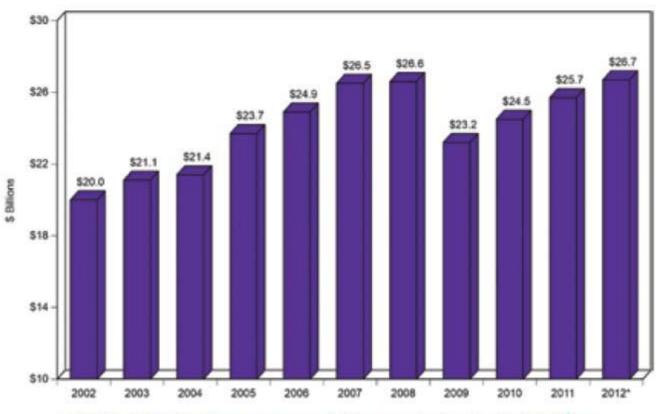
Note: current prices and exchange rates 2005-09, constant (2009) prices and exchange rates for 2010-15; p, provisional; f, forecast

Source: Pira International Ltd.



FPA CAGR 2002 - 2012

Growth in the Flexible Packaging Industry 2002-2012



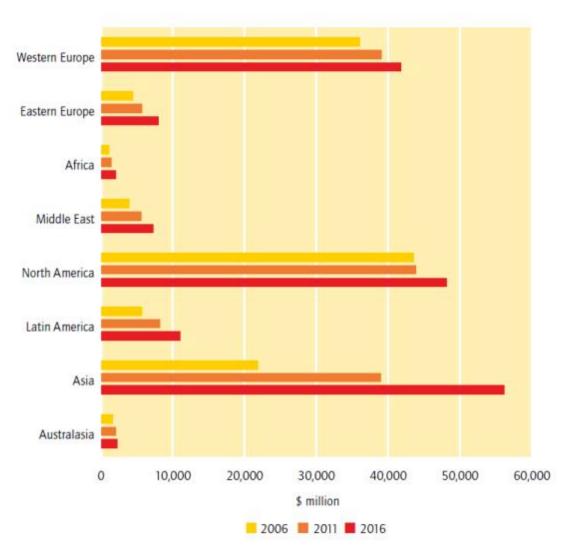




Global Flexo Outlook



FIGURE E.4 Global flexographic printing output by region, 2006-16 (\$ million, current prices and exchange rates)



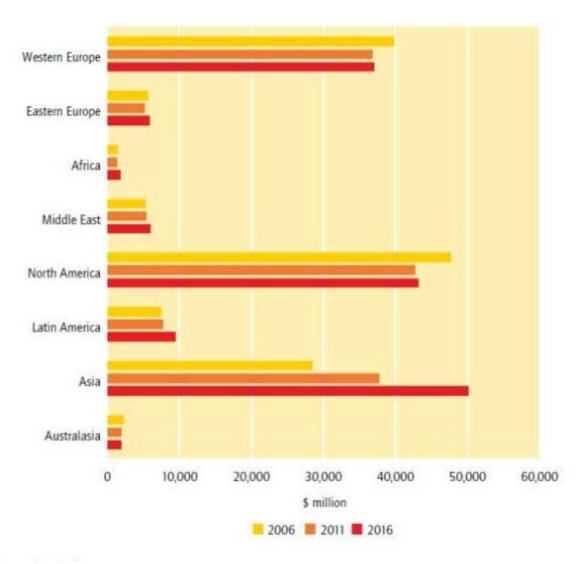




Global Flexo Outlook



FIGURE E.5 Global flexographic printing output by region, 2006-16 (\$ million, constant 2010 prices and exchange rates)



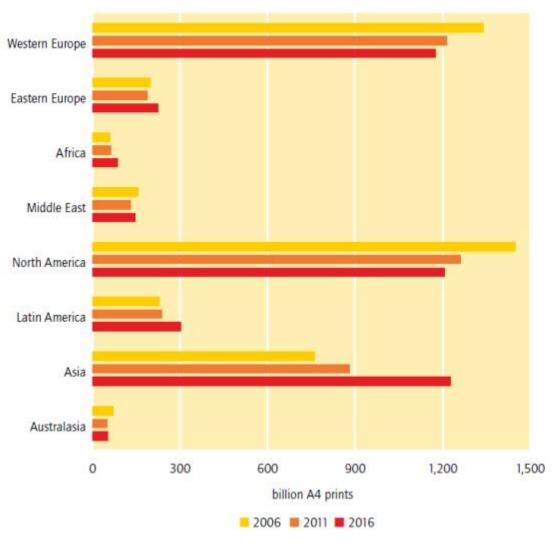




Global Flexo Outlook



FIGURE E.6 Global flexographic printing output by region, 2006-16 (billion A4 prints)







Recent Trends and Outlook Going Forward

	2006	2007	2008	2009	2010	CAGR (%), 2006-10	2011p	%, change 2010-11	2016f	(%) 2011-16
\$ million, current prices	& exchang	e rates								
Corrugated packaging	20,591	21,524	21,407	19,379	20,720	0.2	21,114	1.9	22,665	1.4
Flexible packaging	7,612	8,065	7,998	6,805	7,274	-1.1	7,963	9.5	10,305	5.3
Bags & sacks	1,461	1,549	1,565	1,508	1,508	0.8	1,538	2.0	1,963	5.0
Labels	6,073	6,255	6,014	5,635	5,372	-3.0	5,313	-1.1	5,074	-0.9
Cartons	1,951	2,081	2,129	1,962	2,110	2.0	2,168	2.8	2,475	2.7
Newspapers	724	763	704	620	589	-5.0	586	-0.5	336	-10.5
Envelopes	1,525	1,509	1,466	1,448	1,430	-1.6	1,412	-1.3	1,280	-1.9
Sanitary/kitchenware	2,630	2,670	2,699	2,728	2,759	1.2	2,800	1.5	3,029	1.6
Other	974	996	970	880	889	-2.3	913	2.7	948	0.8
Total	43,542	45,411	44,952	40,965	42,651	-0.5	43,807	2.7	48,076	1.9
\$ million, constant (20)	10) prices &	exchange i	ates							
Corrugated packaging	22,555	22,540	22,206	19,919	20,720	-2.1	20,556	-0.8	20,343	-0.2
Flexible packaging	8,302	8,427	8,285	6,965	7,274	-3.3	7,770	6.8	9,257	3.6
Bags & sacks	1,600	1,622	1,624	1,550	1,508	-1.5	1,498	-0.7	1,762	3.0
Labels	6,628	6,536	6,231	5,765	5,372	-5.1	5,182	-3.5	4,558	-2.5
Cartons	2,124	2,172	2,204	2,002	2,110	-0.2	2,117	0.4	2,224	1.0
Newspapers	784	794	728	628	589	-6.9	574	-2.6	302	-12.0
Envelopes	1,664	1,577	1,519	1,482	1,430	-3.7	1,377	-3.7	1,150	-3.6
Sanitary/kitchenware	2,881	2,796	2,800	2,803	2,759	-1.1	2,727	-1.2	2,719	-0.
Other	1,068	1,044	1,007	906	889	-4.5	888	-0.1	851	0.
Total	47,607	47,507	46,602	42,021	42,651	-2.7	42,689	0.1	43,164	0.2
Billion A4 prints or equ	ivalent									
Corrugated packaging	364	365	359	323	328	-2.6	323	-1.6	316	-0.4
Flexible packaging	186	191	192	188	188	0.2	187	-0.5	205	1.9
Bags & sacks	53	54	56	62	58	2.2	54	-7.3	58	1.0
Labels	122	122	118	108	107	-3.3	105	-1.7	104	-0.2
Cartons	45	45	47	43	44	-0.5	44	-0.4	46	1.2
Newspapers	330	328	301	290	272	-4.7	277	1.8	237	-3.
Envelopes	104	94	89	83	81	-6.0	76	-6.5	58	-5.
Sanitary/kitchenware	178	166	163	156	155	-3.5	148	-4.2	137	-1.0



Global Flexo Outlook – Flexo Plates



Source: Pira International, Ltd. - The Future Of Flexographic Printing, 2011

TABLE 5.4 Flexographic printing plate sales by geographic market, 2006–16 (\$ million, constant 2010 prices and exchange rates)

	2006	2007	2008	2009	2010	CAGR	2011p	%,	2016f	CAGR
						(%),		change		(%),
						2006-10		2010-11		2011-16
Western Europe	270	302	283	289	282	1.1	324	14.8	350	1.6
France	38	39	34	33	34	-2.4	39	14.9	39	-0.1
Germany	49	56	57	54	54	2.5	59	10.6	69	3.0
Italy	33	40	36	41	38	3.7	45	18.8	47	0.6
Spain	21	20	19	18	20	-1.3	23	14.2	24	1.0
UK	82	93	83	90	83	0.4	99	18.7	103	0.7
Other western Europe	47	53	54	53	52	2.5	57	9.9	68	3.5
Eastern Europe	22	24	22	25	27	6.0	32	15.9	43	6.2
Poland	5	6	5	6	6	3.6	7	8.5	6	-0.9
Russia	6	7	7	8	9	9.5	11	21.6	17	10.5
Other eastern Europe	10	11	10	11	12	4.9	14	15.6	19	5.7
Africa	6	6	6	7	7	4.3	8	8.4	11	7.2
Middle East	13	11	11	13	14	1.4	16	15.2	23	0.0
North America	350	357	360	340	352	0.2	385	9.3	458	3.5
Canada	28	25	26	27	27	-1.7	30	11.6	34	2.5
US	321	331	334	314	326	0.3	356	9.1	424	3.6
Latin America	54	51	52	56	69	6.3	79	15.0	125	9.6



Above O/A Flexo growth rate of .2%?





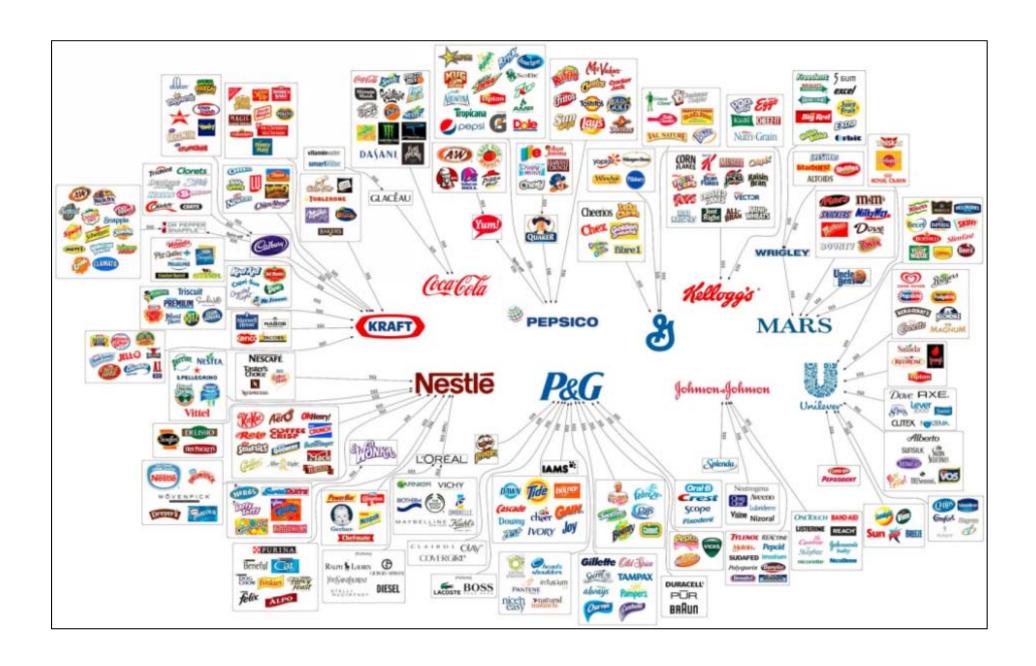
There are many strong indicators of a maturing packaging market in NA





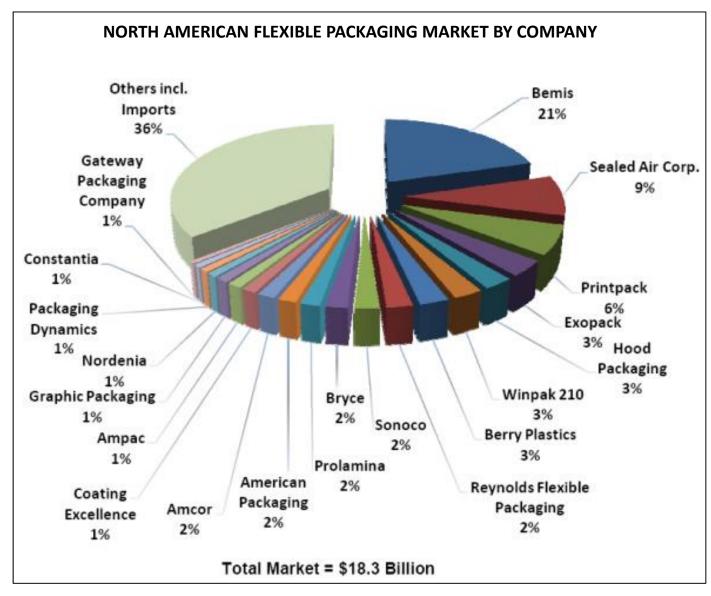
Consolidation at all Levels - CPGs





Consolidation – Flexible Packaging



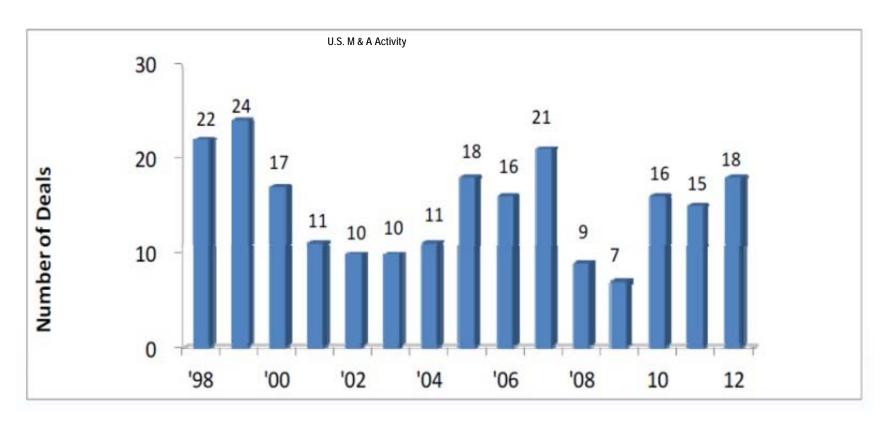






Consolidation – Printer-Converters





Source: FPA State of the Industry 2013





What does that consolidation mean?



U.S. Flexible Packaging Industry Overview



	2002	2012
Total Flexible Packaging Industry	\$ 20.0 B	\$ 26.7 B
Compound Annual Growth Rate (CAGR) last 10 years	3.8 %	2.9 %
Number Companies	665	404
Manufacturing Facilities	980	955
Employees	89 K	79 K
Avg \$ Sales per Employee	\$225 K	\$337 K



However, packaging is still in better shape than the overall commercial printing industry in NA, and the value of packaging on a per capita basis is nearly 5X the global average.





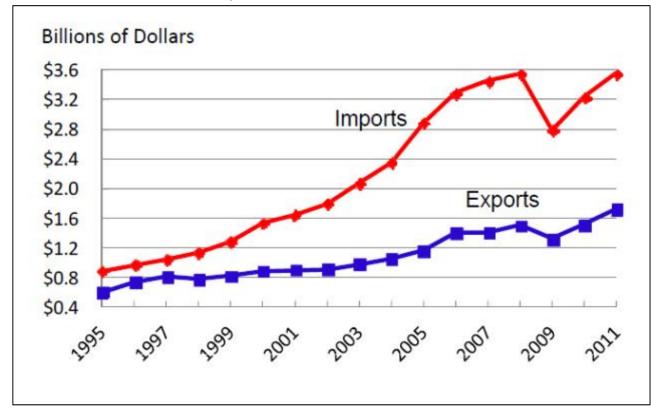


This makes North
America's high value
flexible packaging
market very attractive
to offshore

to offshore competition.

\$1.7 Billion Exp	orts to:	\$3.6 Billion Imports from:		
Canada	36%	China	40%	
Mexico	27%	Canada	18%	
Saudi Arabia	4%	Mexico	6%	
United Kingdom	4%	Germany	4%	
Jordan	3%	Thailand	4%	

Source: FPA State of the Industry 2013





So where are we?



NA Packaging Industry - 2014

- Packaging market in NA is mature (like the population)
- Price pressure throughout value chain
- CPGs driven by shareholder expectations
- Printer consolidation to drive efficiency & value chain control. Now have enormous purchasing power with their suppliers.
- Sourcing takes purchasing lead. Tech & Production in advisory roles
- In some sectors "good enough quality" has been achieved.
- Emphasis on productivity and cost reduction.







As a "Tradeshop" how do I grow and thrive?

- Recognize the realities of the market there is a finite amount of image carrier growth "in the system"
- Define your financial metrics for success
 - Top line growth
 - Volume
 - Market share
 - EBITDA
 - PTOI
 - CFFO
- Continue to expand your offering and look for new and adjacent markets







Suppliers look for differentiation



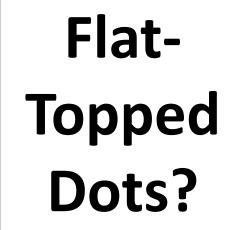
Differentially Modulated Screening



DigiCap & Screened Solids



DuPont™ Cyrel®
Performance
Plates







Pixel+

Esko Full HD

DuPont[™] Cyrel[®] DigiFlow flexographic workflow







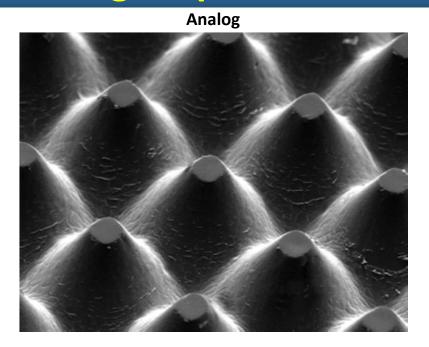
Many new workflow offerings are built around flat-topped dots.

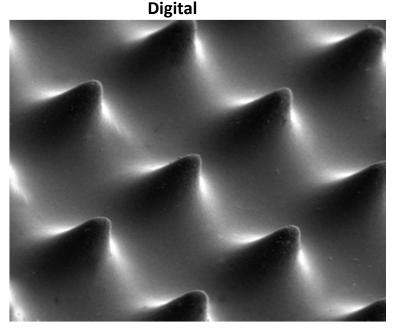




When digital plates were introduced in 1996







- 1. Simplified pre-press & platemaking
- 2. More consistent performance on press
- 3. Improved overall print quality

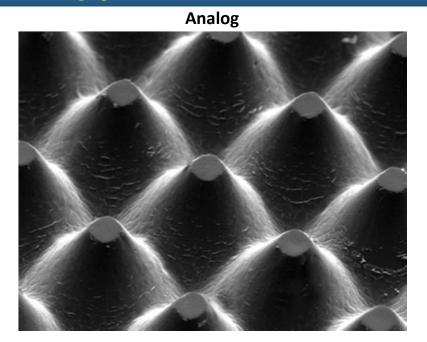


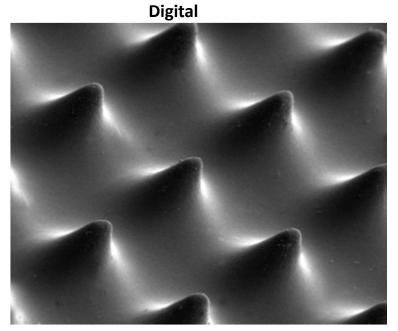
These were the stated benefits



Flat-topped dot claims ~2012







- Simplified pre-press & platemaking
- 2. More consistent performance on press
- 3. Improved overall print quality



Flat-topped dot advocates make same claims today

Flat-Topped Dot Performance



Wait a minute, DuPont is a science company! Can't we measure this stuff?







Reported Attributes of Flat-topped Dots

- Greater press latitude
- Longer plate life
- Higher solid ink density







Can we see and measure a difference in performance for the Standard Digital vs. the Flat Topped (DigiFlow) Dot?

- Impression Latitude: as reflected by varying stickyback
 - Trial Date March, 2013
- Impression Latitude: as reflected by cylinder impression
 - Trial Date Nov., 2013
- Run Length: as reflected in increasing dot gain
 - Trial Date Nov., 2013





Standard vs. FTD - Effect of Stickyback



- Two analyses
 - MinDot
 - At multiple 'Printed Dot' levels
- Five different 3M tapes
 - 1120, 1920, 1320, 1020, 1720
- Four different Cyrel® plates
 - (DPR DSP DFR DFP)
- Standard (air) and Flat-topped (DigiFlow) workflows

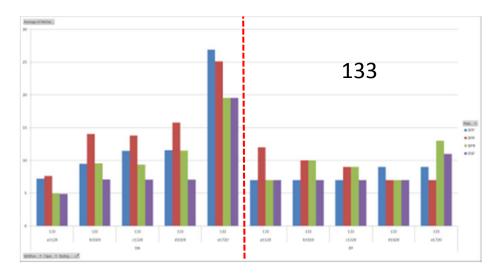


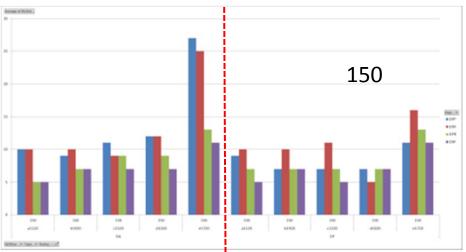


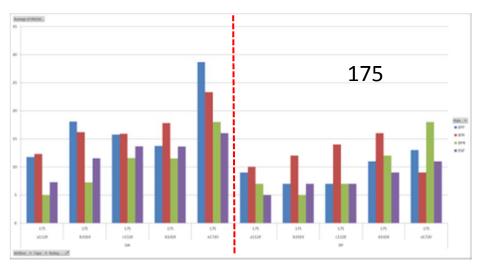


Standard vs. FTD - Effect of Stickyback on Minimum Dot









- Standard (air) workflow Digital plates & tapes are grouped on the left. The same plates produced in a flat-topped workflow on the right
- Appears to be a relative insensitivity towards tape selection for the FTD plates in terms of minimum dot.
- At the lower rulings, generally similar
 MinDot values between standard digital
 and FTD. (to be expected)

Standard vs. FTD - Effect of Stickyback thru tonal range

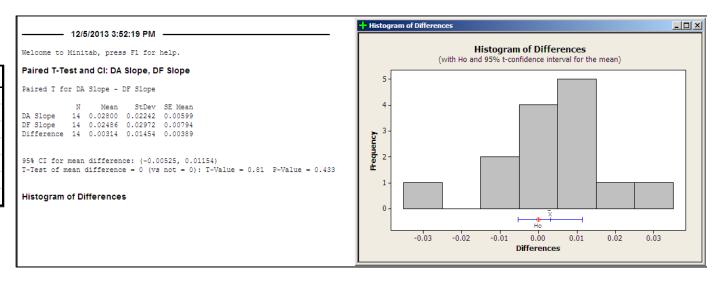


Slope of Density vs. Tape

- Performed the comparison on an equivalent 'printed' dot basis
- Calculated the slope of D vs. Tape
- Paired T Test were done to determine if the Slopes of the Std. Digital plots were significantly different from those for the DigiFlow items
- Measurements done at 10%, 15%, 25%, 50% 75% & 100% coverage

We could find <u>no statistical evidence</u> that the slopes are different between these two workflows

Printed Dot	Nominal DA	Nominal DF
Min	5.2	1.2
10	5.6	2
15	7.2	3
25	10	7
50	25	20
75	50	40
100	100	100



Standard vs. FTD - Effect of cylinder impression



Impression Latitude

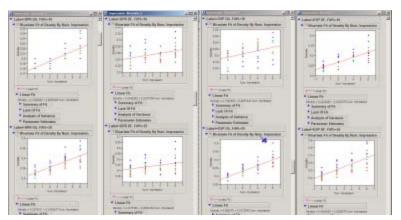
- Four plates each of
 - Cyrel® DPR in standard workflow
 - Cyrel® DPR in flat-topped workflow
 - Cyrel® DSP in standard workflow
 - Cyrel[®] DSP flat-topped workflow
- A total of 4 impressions were flagged and sampled for each of these
 16 plates
 - Kiss,
 - K+2,
 - K+4,
 - K+6

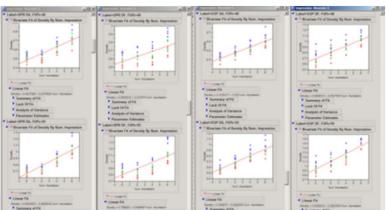


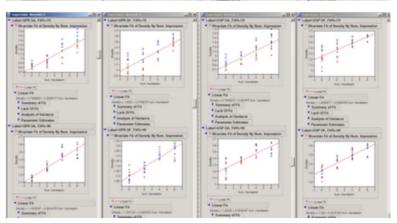


Standard vs. FTD - Effect of cylinder impression









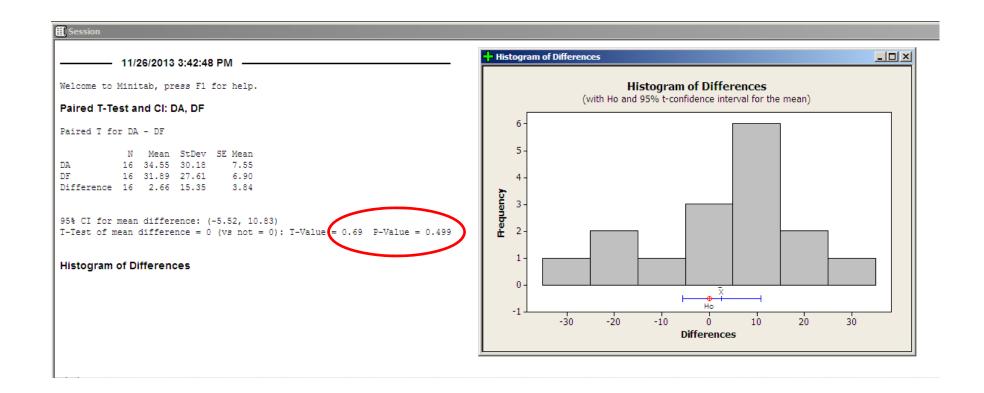
Compilation	Compilation of slopes from JMP analysis (All slopes \times E-3)									
Fill%	DPR DA	DPR DF	DSP DA	DSP DF						
1.2	7.5	2.3	16	3.5						
3	2.4	2.4	2.3	0.81						
10	6.5	3.8	5.1	12						
25	14	8.5	17	39						
40	37	32	32	55						
55	61	49	59	85						
70	92	71	82	57						
90	63	47	56	42						

A significant difference in Paired T Test between the DA and DF slopes would indicate a potential difference in Impression Latitude between these two workflows.

Standard vs. FTD - Effect of cylinder impression



- Paired T Test
 - P-Value indicates that there is <u>no significant difference</u> between the Density vs. Impression slope for the Standard Digital and FTD workflows



Standard vs. FTD – Run Length



Flat Top vs. Digital Dot – Continuity Testing

3" targets of standard digital dot DPR and flat-topped dot DPR were mounted on decks 2 & 3 of the Avanti Central Impression Press at Fox Valley

Size and location allowed for these targets to run 'continually' while running other print trial items. The 3" targets printed on either side of the 'main' target on Deck 1

Samples were obtained over the course of approximately 30M impressions

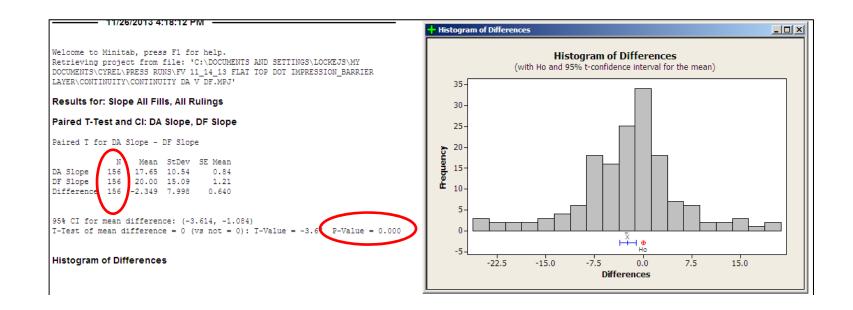




Standard vs. FTD – Run Length



- Histogram shown below details the differences found for each pair
- H₀ is the point where there is no difference between the DA and DF dot performance with regard to Dot Gain over the course of 30M impressions
- These data actually show that the Digital Dot very slightly outperforms the DigiFlow dot in this regard (Mean slope is slightly lower) [Normal T tests will not pick this up, only Paired T Tests will.] This is statistically significant, but is practically not significant.
- Under normal conditions, there appears to be little difference in run length between standard digital dots and flat topped dots.





So does this mean that there is no significant difference between standard digital and Flat-topped dots?





Standard vs. FTD - There are Cost Implications



FTD requires capital investment & extra consumables

Investment

- Kodak Imager & Laminator
- MacDermid *- Laminator
- Flint *- NExT exposure system
- DuPont *— DigiFlow exposure unit (either retrofit or new)

Consumables (In addition to photopolymer)

- Kodak TIL Film
- MacDermid LUX film
- Flint ?
- **DuPont** Nitrogen





^{*} LAMs based workflow may benefit from Esko Pixel Plus

Standard vs. FTD – Productivity Impact



FTD workflows take longer than standard digital

Time penalties associated with some combination of:

- High res imaging (slower CDI speed)
- Laminating
- Purging Atmosphere
- Longer Main Exposure
- Longer PX/LF
- Limited to solvent workflow



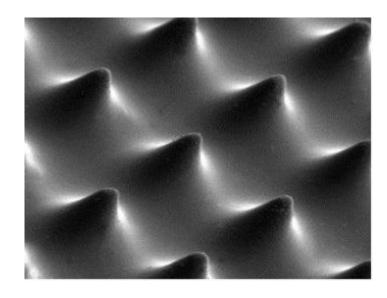
Each FTD workflow seems to have a different bottleneck, but total throughput time is remarkably similar for all.

Standard vs. FTD - The Bottom Line

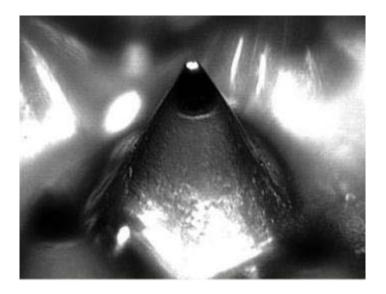


The test results have led us to become dot profile agnostic for Flexible Packaging or T & L printing

- Benefits of flat-topped dot for corrugated have been proven
- In flexible packaging or Tag & Label applications the decision of best dot profile should be made on a case by case basis.



Standard Digital Dot



DigiFlow Dot





Standard vs. FTD – Solid Ink Density



But don't flat-topped dots provide higher ink density?

- Greater press latitude
- Longer plate life
- Higher solid ink density
- Higher SID is an attribute of the flat-topped dot workflow; not flat-topped dots themselves.
- A FTD workflow allows solid screening programs such as DigiCap,
 Microcell or Pixel Plus to be effective.
- Screening of the solids is <u>required</u> for a standard surface digital plate to have a higher SID on smooth substrates.





Cyrel® DSP and Cyrel® FAST DFP



Cyrel® Performance Plates will have higher solid ink density whether in standard or flat-topped workflow



Standard Digital Plate surface @ 700X magnification



Cyrel® DSP engineered surface @ 700V magnification

because it's built into the plate



Following is a schematic workflow chart showing the imaging, plate and exposure control knobs available to Tradeshops servicing the flexible packaging or tag & label segments.

Tradeshops will be able to define the best high ink transfer plate solution to work with their existing equipment configuration and also consider possible future equipment configurations.















DPRStandard Digital

Standard

Expose in Air Std. Digital Dot



DSP High SID Solvent Process

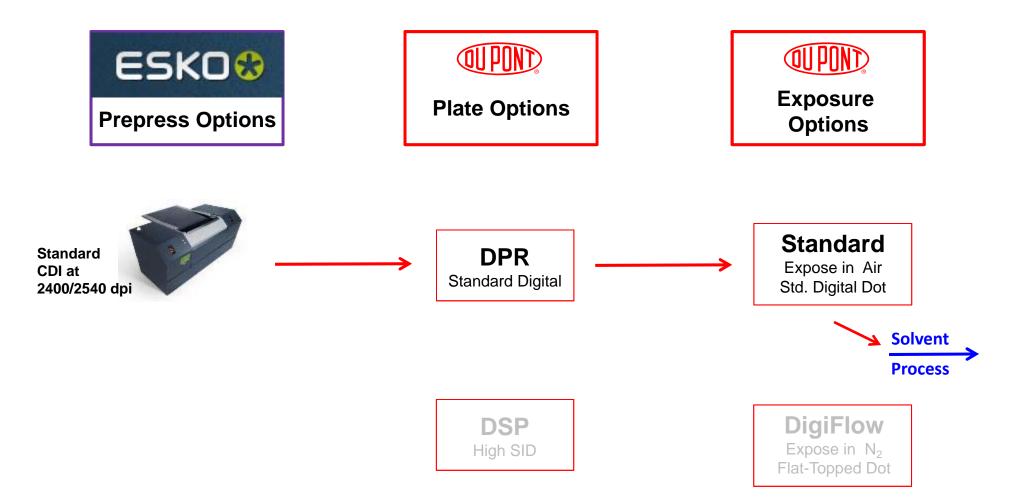
DigiFlow

Expose in N₂ Flat-Topped Dot

Pixel+

The Tradeshop's control knobs

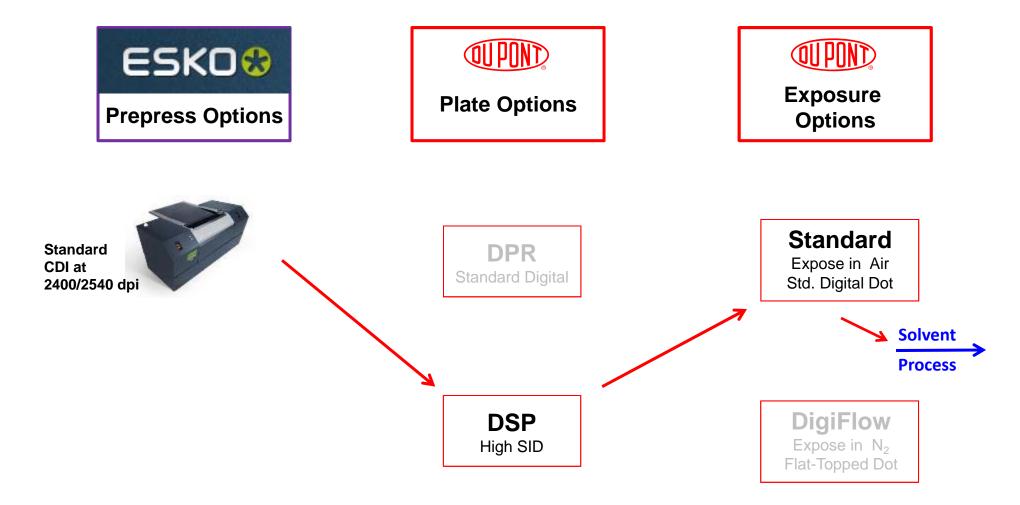




- Basic CDI with standard screening capabilities
- DPR for high quality halftones (DPL for solids and linework)

Good quality digital flexo at highest throughput speed Lowest investment in equipment and plate

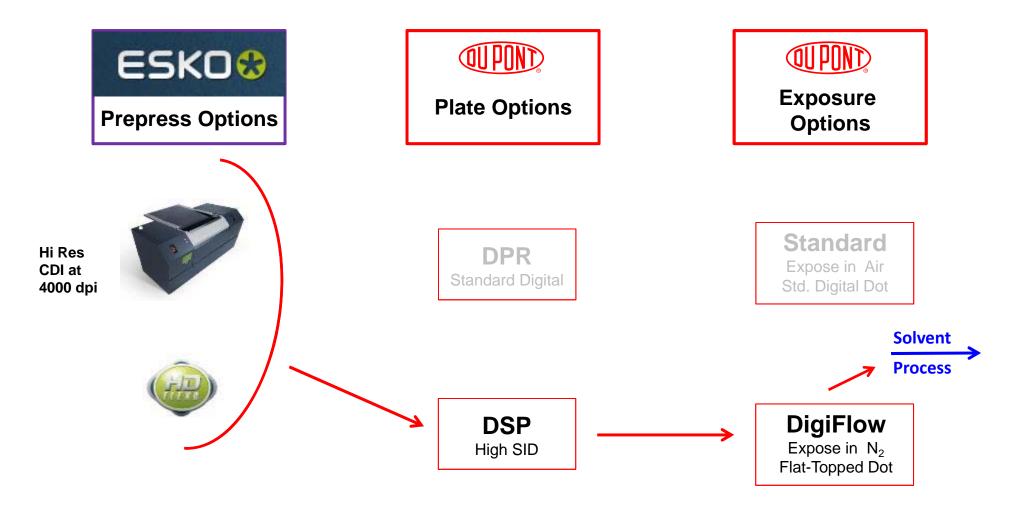




- Basic CDI (or equivalent) with standard screening capabilities
- DSP for high quality halftones with very good SID

Better quality digital flexo at highest throughput speed Lowest investment in equipment with small plate premium

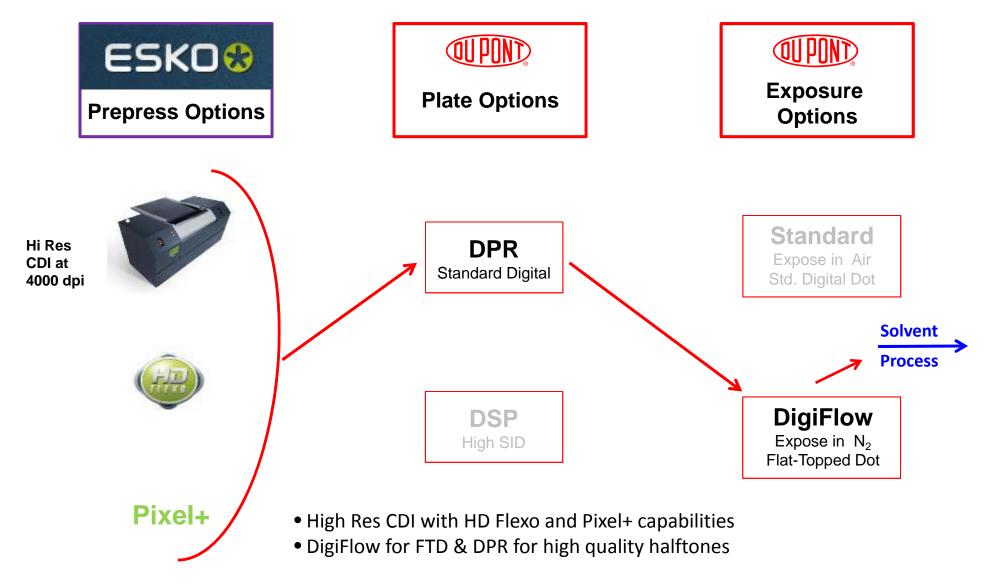




- High Res CDI (or equivalent) with HD Flexo screening capabilities
- DigiFlow for FTD & DSP for high quality halftones

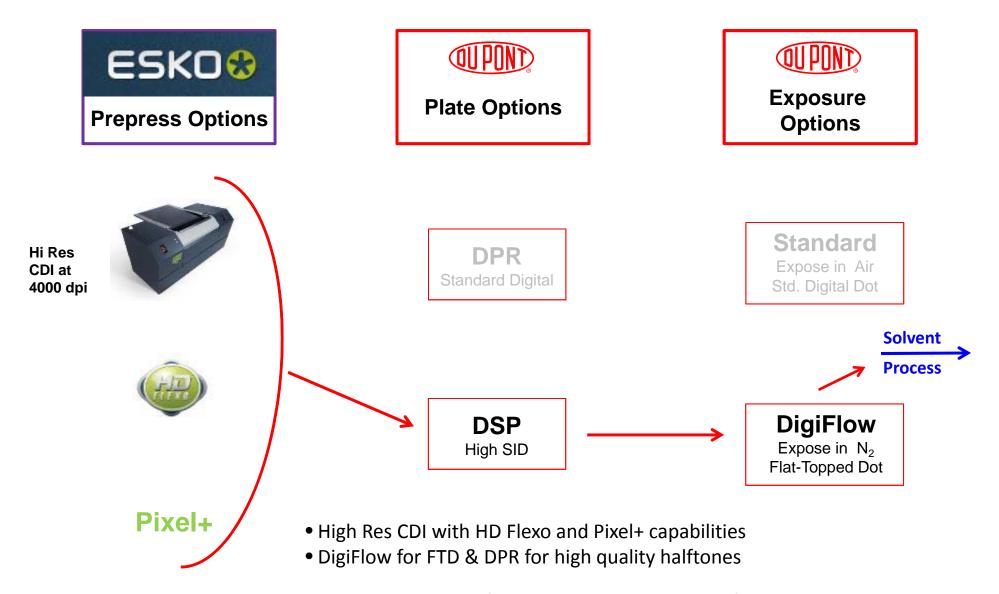
Better quality digital flexo with flat-topped dot Mid-level investment in equipment with small plate premium





Best quality flat-topped digital flexo
Highest investment in equipment with standard plate





Best quality flat-topped digital flexo
Highest investment in equipment with small plate premium



We've produced samples to show how the different plate and workflow configuration actually print.

DPR

2540dpi/no solid screening/CS25 highlight screening/Standard Digital

DSP

2540dpi/no solid screening/CS25 highlight screening/Standard Digital

DSP

4000dpi/no solid screening/C21 highlight screening/DigiFlow

DPR

4000dpi/MCWSI solid screening/C21 highlight screening/DigiFlow

DSP

4000dpi/MG45 solid screening/C21 highlight screening/DigiFlow





So what did we find?

DPR2540dpi/no solid screening/CS25 highlight screening/Standard Digital	Density	C 1.16 M 1.14 Y .97 K 1.31 Good highlights, moderate print contrast, weak solids, evident pinholing
DSP 2540dpi/no solid screening/CS25 highlight screening/Standard Digital	Density	C 1.48 M 1.35 Y 1.01 K 1.51 Good highlights, very good print contrast, very good solids, ddramatically reduced pinholing
DSP 4000dpi/no solid screening/C21 highlight screening/DigiFlow	Density	C 1.45 M 1.30 Y 1.02 K 1.59 Good highlights, very good print contrast, very good solids. dramatically reduced pinholing. Appearance similar to DSP in standard digital workflow.
DPR 4000dpi/MCWSI solid screening/C21 highlight screening/DigiFlow	Density	C 1.74 M 1.60 Y 1.14 K 1.91 Good highlights, very good print contrast, good solids. Smooth solids
DSP 4000dpi/MG45 solid screening/C21 highlight screening/DigiFlow	Density	C 1.66 M 1.65 Y 1.12 K 1.80 Good highlights, very good print contrast, good solids. Smooth solids



This confirms that a Cyrel® Performance Plate is the simplest and most productive solution for high ink transfer whether in a standard digital *or* flat-topped workflow.







Thank you!

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