

# Advances In Inkjet Receiver Coatings

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# Agenda

- ❖ **Overview of Market Drivers**
- ❖ **Coating Chemistries Used & Methods of Application to Paper, Plastic, and Textile webs**
- ❖ **End-use Requirements and how they affect Coating and Testing protocols**
- ❖ **New advances in High Solids and Radiation Cured Chemistries**
- ❖ **The advent of Nanoporous Chemistry Technology and Application Methods**
- ❖ **Market Trends and their effect on Technology Deployed**



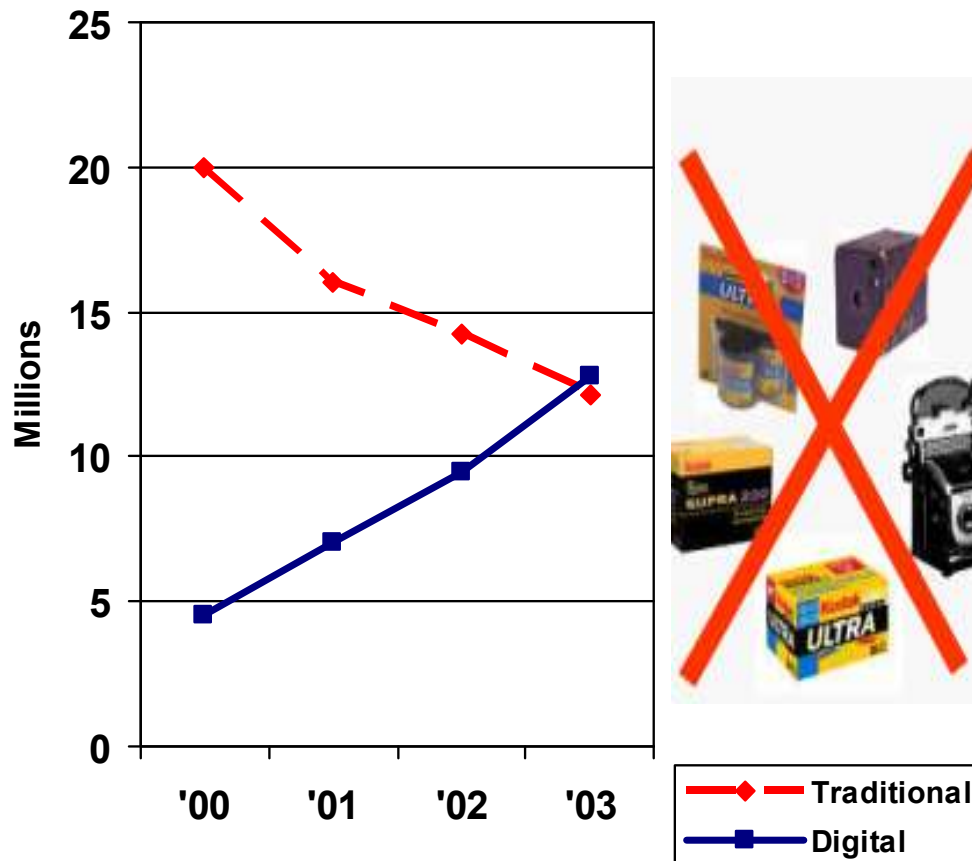
# Markets and Drivers



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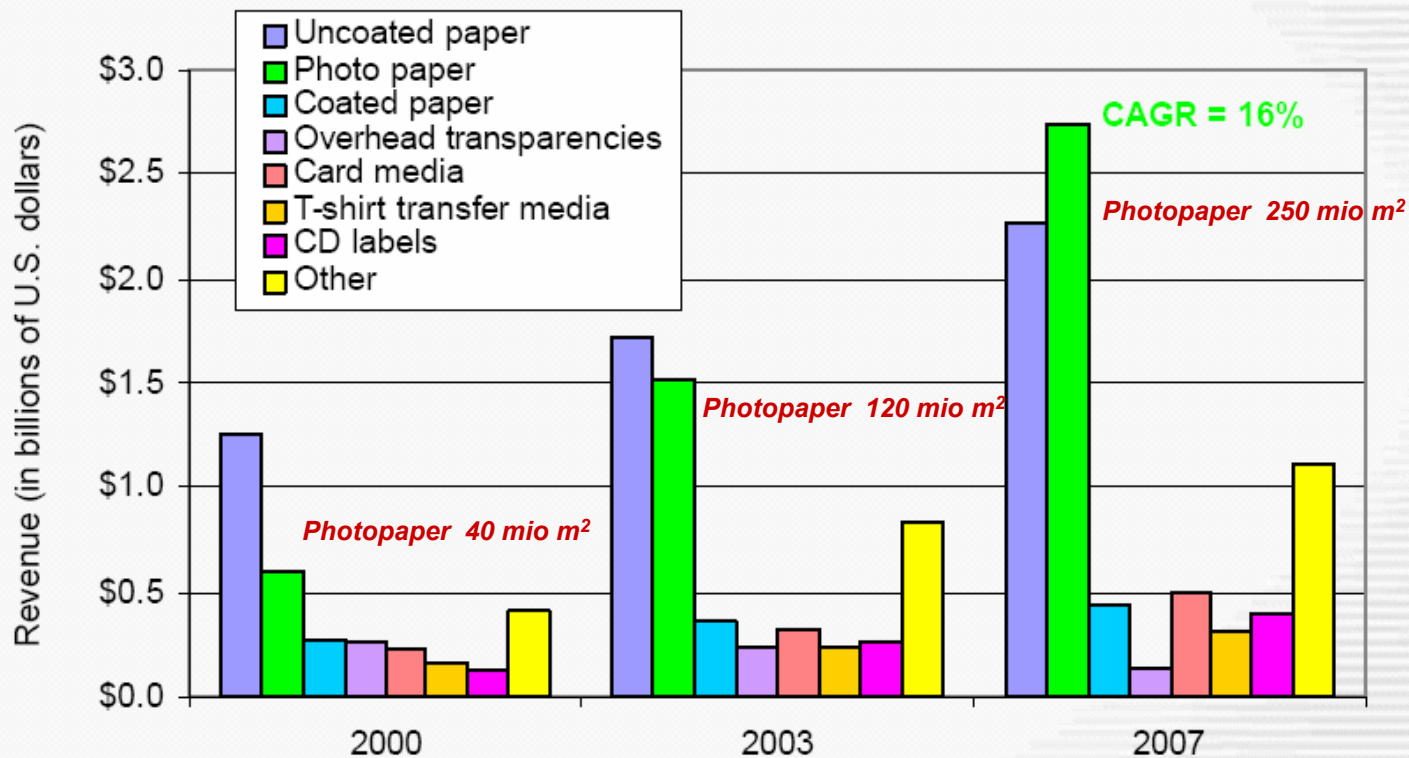
# Adoption of Digital Cameras

US Consumer Sales - Cameras



# WW Desktop Media

Worldwide Desktop Ink Jet Media Revenue by Product, 2000, 2003, and 2007

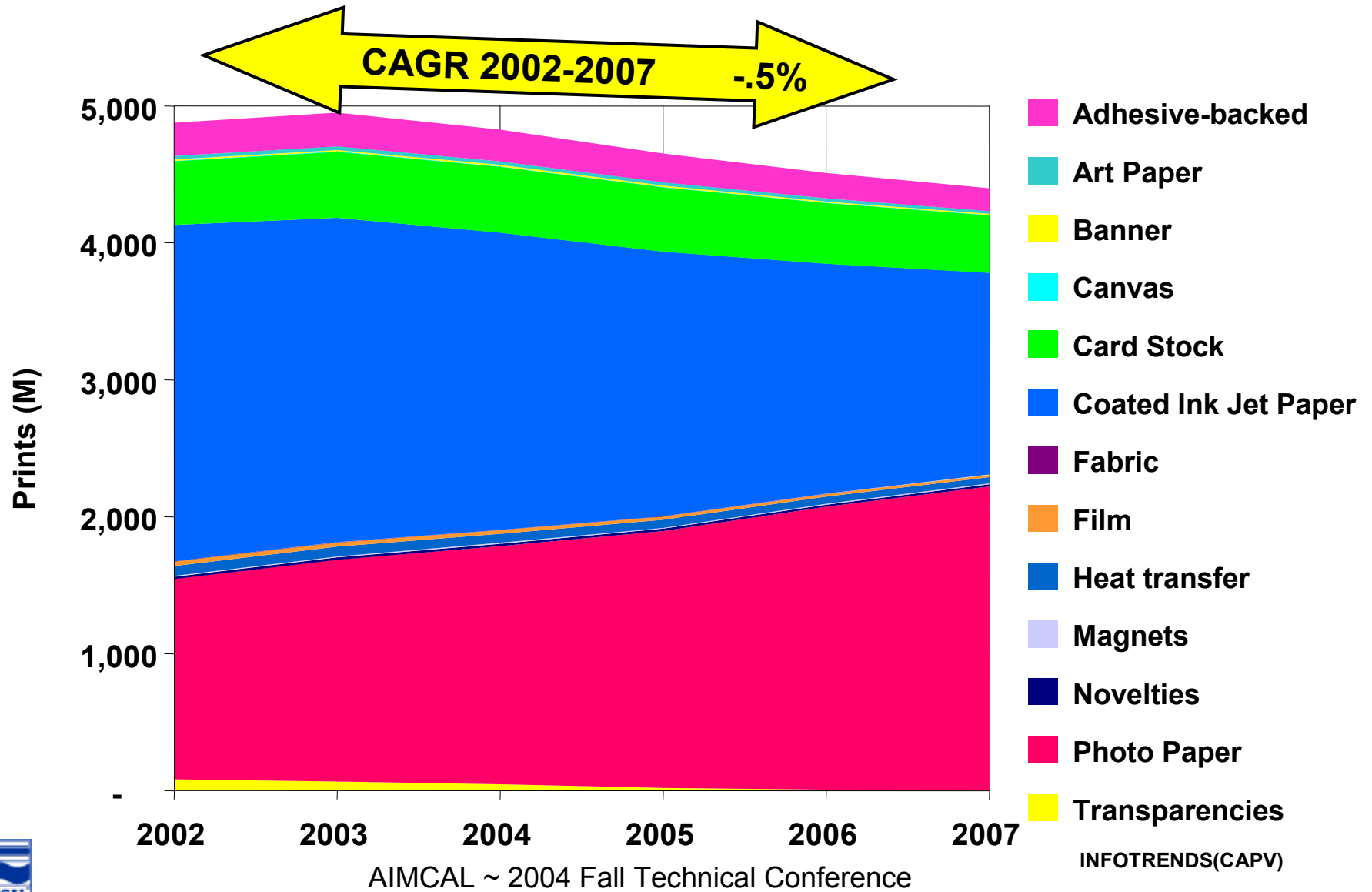


Overall CAGR = 8.2 percent

Source: Lyra Research, Inc., Hard Copy Supplies Advisory Service, Second-Half 2003 Forecast

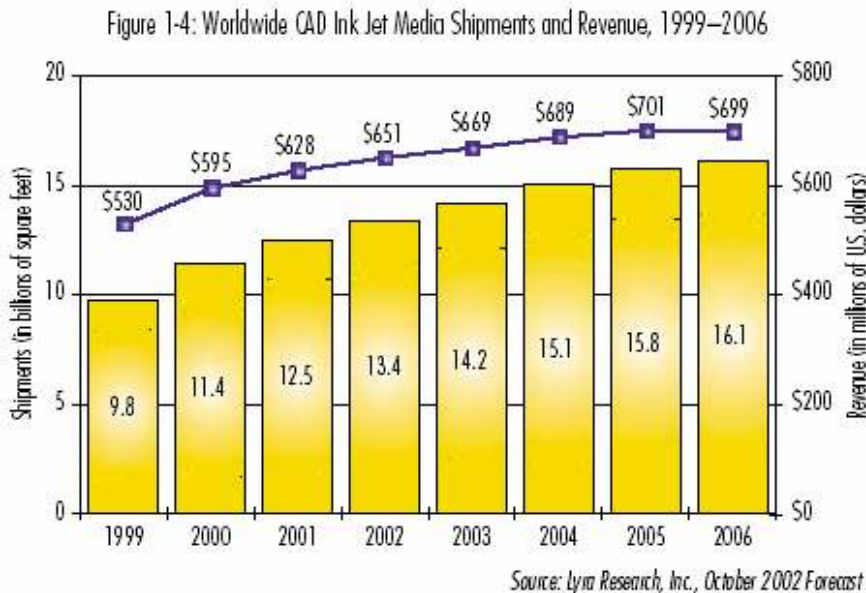


# U.S. Desktop Inkjet Prints (M) on Specialty Media



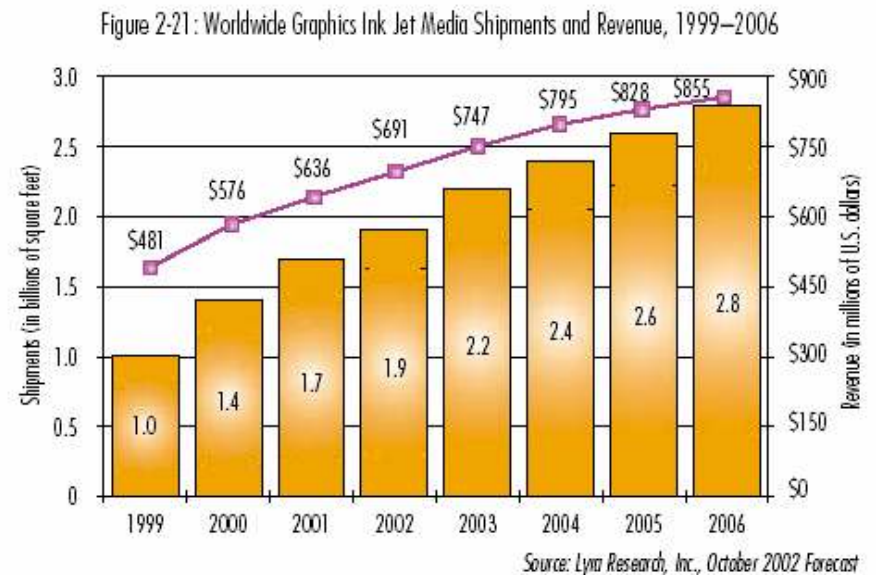
# WF Market Size – Total WF \$1.4b at End-user

- AEC/CAD**



- Enduser \$ Growth +2%
- Enduser Volume +5%

- Graphics/Display**



- Enduser \$ Growth 6%
- Enduser Volume +11%

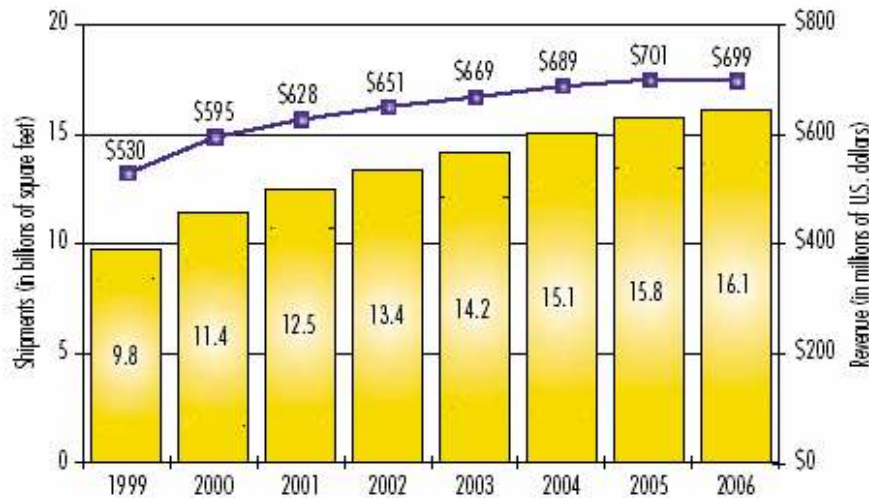


# WF Market Size ~ AEC/CAD

## AEC/CAD

## Product Segmentation

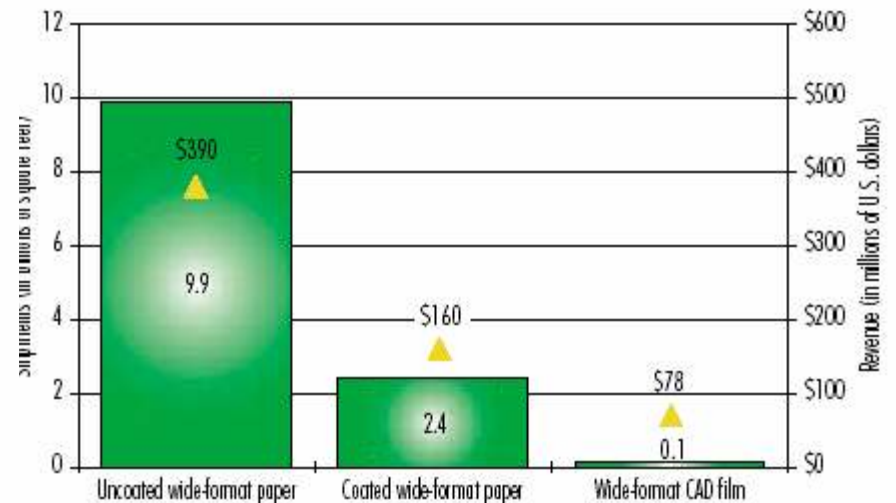
Figure 1-4: Worldwide CAD Ink Jet Media Shipments and Revenue, 1999–2006



Source: Lynn Research, Inc., October 2002 Forecast

- Enduser Revenue +2%
- Enduser Volume +5%

Figure 1-5: Worldwide CAD Ink Jet Media Shipments and Revenue by Media Type, 2001



Source: Lynn Research, Inc., October 2002 Forecast

- Uncoated Growing
- New Printers use UC



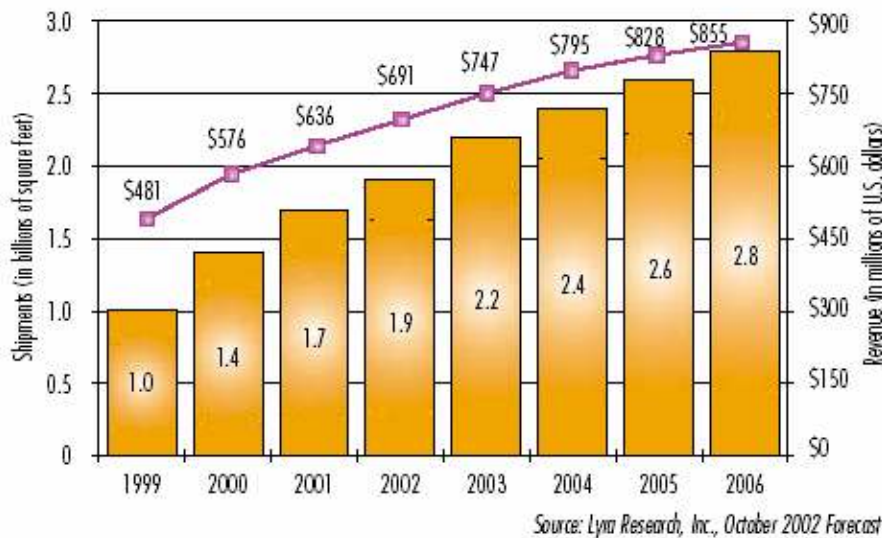


# WF Market Size ~ Display Graphics

## Display Graphics

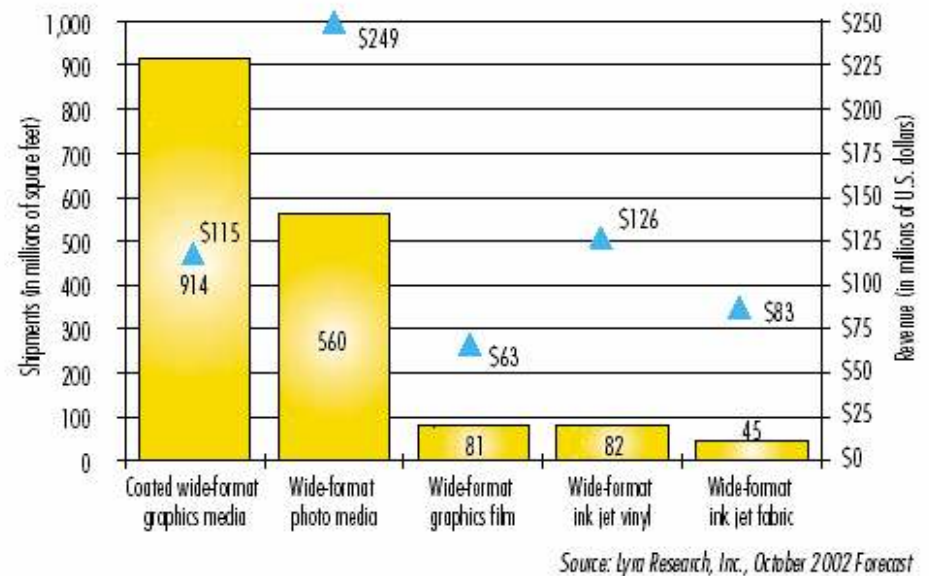
## Product Segmentation

Figure 2-21: Worldwide Graphics Ink Jet Media Shipments and Revenue, 1999–2006



- Enduser Revenue +6%
- Enduser Volume +11%

Figure 2-22: Worldwide Graphics Ink Jet Media Shipments and Revenue by Media Type, 2001



- Photopaper #1 in \$\$
- Vinyl #1 in \$/s.f.



# Coatings & Chemistries Used



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# Technology Platforms

	<b>Substrates</b>	<b>CWT</b>	<b>Solids</b>	<b>Viscosity</b>	<b>Cost</b>
<b>Microporous (MP)</b>	<b>RC Paper/Film</b>	<b>Desktop:</b> 20-40 gsm	<b>20-35%</b>	<b>50 - 1000 cps</b>	<b>\$\$\$\$</b>
		<b>Wide Format:</b> 25-60 gsm	Aqueous (+OH)	Aqueous (+OH)	Both R.M & Process
<b>Porous Polymer Technology (PPT)</b>	<b>RC Paper/Film Banner, Canvas</b>	<b>Desktop:</b> 15-30 gsm	<b>10-25%</b>	<b>100-600 cps</b>	<b>\$\$\$</b>
		<b>Wide Format:</b> 25-35 gsm	Aqueous (+OH)	Aqueous (+OH)	R.M
<b>Swellable</b>	<b>RC Paper/Film</b>	<b>Desktop:</b> 15-20 gsm	<b>10-20%</b>	<b>50 - 1000 cps</b>	<b>\$\$</b>
		<b>Wide Format:</b> 15-25 gsm	Aqueous/Solvent	Aqueous/Solvent	
<b>Premium Matte</b>	<b>C1S Paper/Film</b>	<b>Desktop:</b> 5-10 gsm	<b>10-30%</b>	<b>50 - 300 cps</b>	<b>\$</b>
		<b>Wide Format:</b> 5-15 gsm	Aqueous	Aqueous	low cost focus



# Technology Platforms (contd.)

	<b>Coating Methods</b>	<b>Composition</b>	<b>Ink Compatability</b>	<b>Comments</b>
<b>Microporous (MP)</b>	<b>Slot-Die</b>	<b>Alumina or Silica (&gt;90%)</b>	<b>Pigment (++)</b>	<b>Instant-Dry</b>
	<b>Multiple Head</b>	<b>Binder, X-Linkers</b>	<b>Dye (-)</b>	<b>Light/Ozone Fastness</b>
<b>Porous Polymer Technology (PPT)</b>	<b>Rod</b>	<b>Resins (~85%)</b>	<b>Pigment (++)</b>	<b>Durability</b>
	<b>Knife over Roll</b>	<b>Additives (~15%)</b>	<b>Dye (+)</b>	
<b>Swellable</b>	<b>Rod</b>	<b>Resins (~85-95%)</b>	<b>Pigment (--)</b>	<b>Print Stability</b>
	<b>Air Knife, Blade</b>	<b>Pigments (~10%) Additives (~5%)</b>	<b>Dye (++)</b>	<b>Dry Time</b>
<b>Premium Matte</b>	<b>Rod</b>	<b>Pigments (75%)</b>	<b>Pigment (+)</b>	<b>Print Quality</b>
	<b>Air Knife, Blade</b>	<b>Binders (~20%) Additives (~5%)</b>	<b>Dye (+)</b>	



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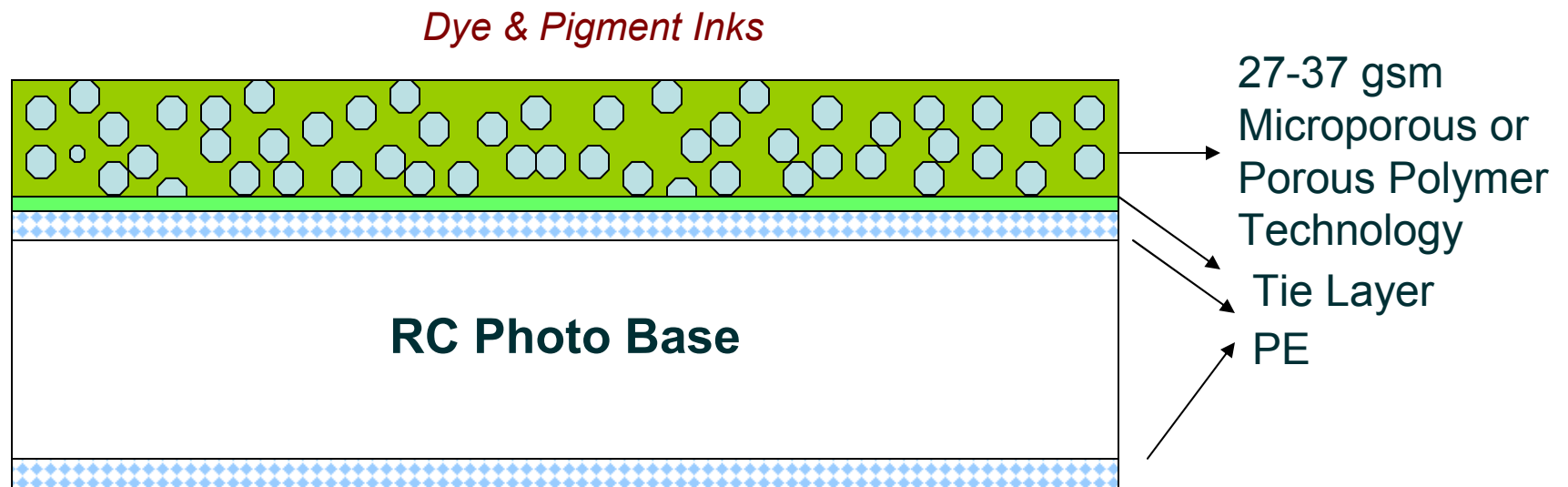


# Performance Matrix

	Dry-Time	Waterfast (w/ X-Linker)	Image Quality	Archival Properties
Microporous (MP)	++++	++	++	+ Pigment
				(-) Dye
Porous Polymer Technology (PPT)	+	++	+	+ Pigment
				+ Dye
Swellable	(-)	Gloss (-)	+++	++
		Matte +		
Premium Matte	++	++	+	+

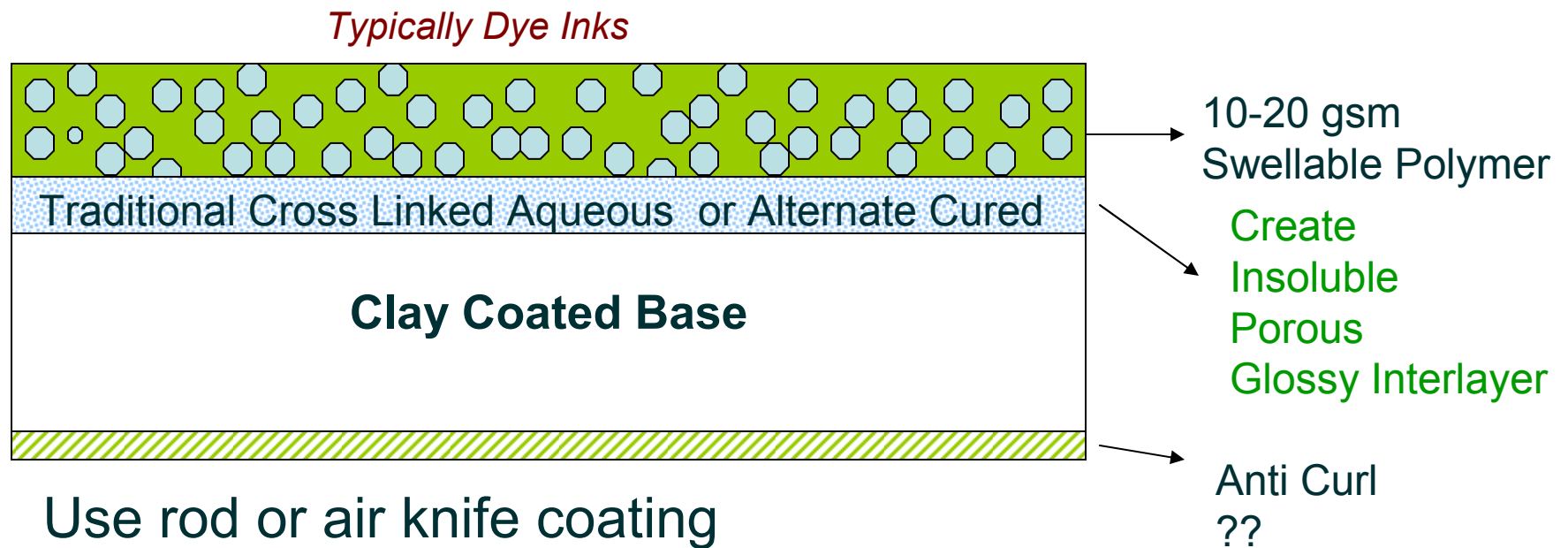


# Photo RC Paper



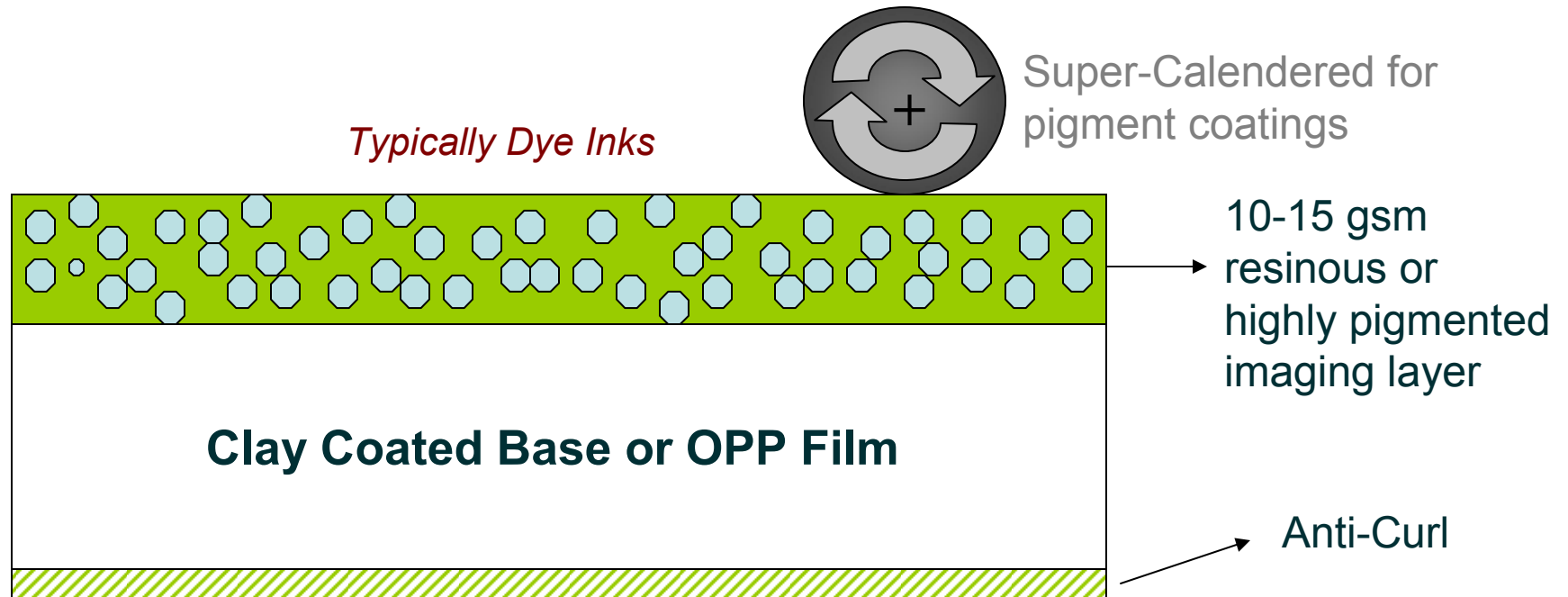
Uses heavy-weight deposition coating methods

# General Purpose Photopaper





# Everyday Photo or Eco-Banner



Use lowest cost coating technologies

# Curing Issues



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# Inkjet Coating Curing Issues

## Thermal Curing

- **High Energy** to dry as coatings highly aqueous and susceptible to flow defects.
- **X-Linkers** can now lower cure temperatures to 60C
- **Thicker** and microporous coatings take special handling

## Radiation Curing

- **Low Energy** and higher solids coatings
- **UV** finding uses but prone to cracking and poor anchorage. More substrate independent.
- **EB** not used as too much energy used to drive off water (overkill)



# Trends



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# Market Trends

- **High Growth of Eco-Solvent Coaters**

- **Non-Vinyl Substrates** (Papers, Films, Textiles) require unique tie-coatings
- **Aqueous IJ Receptor** Coatings are improving greatly to perform outdoors and in tough use environments

- **Emergence of Competing Technologies**

- **Dye Sublimation** taking hold of kiosk and small footprint printers
- **Color Laser** technology greatly improving on price (device) and print performance capabilities
- **IJ** is still >80% Photo Print Market



# Market Trends (contd.)

- **Far East Competition**

- **China and Taiwan** taking stronger positions, esp. in Solvent and Olefin Films
- **Japan** still is major Technology Developer

- **Domestic Developments**

- **R&D Depts.** Consolidating, driving ready-made solutions
- **Intellectual Property** is still a concern
- **High Growth** bringing new participants



# Technology Trends

- **Aqueous Solutions Taking Over**
  - Replacing Solvent Type
  - Performance is There!
- **Cost Down Pressures Strong**
  - Consumer and End-user Markets pushing
  - Retailers are now direct to Manufacturers
- **Multiple Layer Coating Technologies**
  - Purpose Built Lines
  - Bottom Up Product Development
    - » Applications Driven
    - » Designed for Technology, not “Bolt-On”



# Process Trends

- **Lower Energy Drying**
  - Chemistry helping
  - Improvements in Oven Technology
- **Faster & Wider**
  - Multiple Coating Heads
  - Slot Die & Cascade Coating Heads
  - In-Line One-Pass Designs





**Now for a Commercial.....**



# Esprit Technologies

- **Electronics**
  - » Stripping and Planarization Chemistries
- **Automotive**
  - » CAB Flux
- **Pharmaceutical**
  - » Specialty Intermediates
- **Digital Imaging**
  - » Diazo & Phototool
  - » IJ Coatings & Components
  - » Toner CCA's and Additives





# Thank You

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