

## FLEXCEL NX ULTRA Solution: Technical Achievement in Aqueous Plate Processing

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## Why did Miraclon develop NX Ultra?

- FLEXCEL NX provides award-winning
  - Consistency
  - On-press productivity
  - Quality
- In addition to award-winning FLEXCEL NX, customers were looking for
  - A solvent free plate making solution that was clean, consistent, and sustainable
  - Capability to make a first plate in less than an hour to improve higher efficiencies on press when an unplanned plate change is required
  - Very high plate making productivity (>25 plates in 8-hour shift)

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## The 30-Year Problem in Water-Wash Plate Making

- All previous water wash plate making solutions use the same processing agent (i.e. Sulfur/ Sodium dishwashing detergent)
- Most are batch processes with low plate processing volume productivity

All suffer from a build-up of unexposed polymer and black LAMS layer debris (which is harder to process and clings on the processor surfaces), leading to ...

Unwanted artifacts that can degrade the plate and print quality

Frequent and time-consuming processor cleaning (extra hours of downtime)

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## Advantages & Disadvantages of Platemaking Solutions

### Thermal

Fast time to first plate, easy to use, solvent-free  
**but**  
has lower on-press performance/efficiency, lower plate life, lower print quality and GHGs are emitted with used developer roll material hazardous waste incineration.

### Solvent

Better on press performance/efficiency, higher print quality,  
**but**  
uses solvent, creates VOCs & GHGs, and slower time to first plate.

### Aqueous

Fast time to first plate, solvent free, VOC free, GHG free, higher print quality  
**but**  
due to lack of consistency in plate making, performance and productivity on press are impacted by a random deposition of debris on the surface of the printing plate and consequent printing defects. Also higher plate processor maintenance is required due to buildup of photopolymer debris causing more downtime.

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## NX Ultra Technology



### Award-winning FLEXCEL NX performance

- consistency
- on-press productivity
- quality



### High-speed plate making

- first plate in less than an hour
- very high productivity (>25 plates in an 8-hour shift)



### Solvent-free and VOC-free process

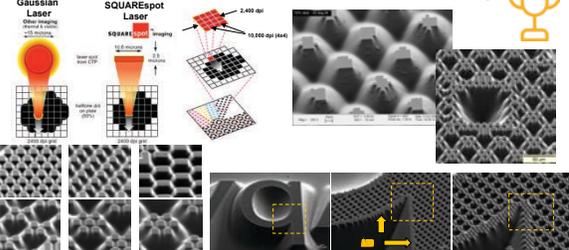
- aqueous plate processing
- clean, consistent plates

**Flexo. Elevated.**

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## NX Ultra based on Kodak FLEXCEL NX Technology



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### FLEXCEL NXH & NXUH Similar Dot Formation

NXH 1.14 mm

NXUH 1.14 mm

**Flexcel NXH 1.14 mm and Flexcel NXUH Ultra 1.14 mm  
10 micron plate dot comparison: Red Grid Line 50 microns (70X magnification)**

### Efficiency comparison 3548

#### Flexo plate making technologies

3548 Time to 1st Plate

**FLEXCEL NX Ultra is fast**

- press-ready plate in less than one hour
- minimizing costly press downtime
- enabling fast turnaround of last-minute client changes

\*Imaging \*Exposure \*Processing \*Drying/Cool Down \*Finishing

\* Flexcel NX01 flow times for 3548 are with traditional Varimord EVO 3 processing equipment as reference.  
\* Etico Col flow times for 3548 (Optic 40 Imager, 4000 dpi (Solvent) 2560 dpi (FAC3)), Print + as reference or Crystal + Varimord IP automation for solvent

### Productivity in the plate room

**FLEXCEL NX Ultra Plates/Shift**

**FLEXCEL NX Ultra is productive**

- more than 25 finished plates per shift
- matching or exceeding the productivity of any thermal system
- significantly more productive than a solvent-based system
- meet peak volume plate making demands

### Historical stigma attached to water wash flexo plates...

- QUALITY** - Residual debris from plate processing remains on plate surface
- CONSISTENCY** - variation from plate to plate
- PRODUCTIVITY** - Frequent cleaning and maintenance of processor required
- UPKEEP** - Processor brushes and interior components get "gummed up and dirty."
- PERFORMANCE** - Very short life cycle of processing agents
- DISPOSAL** - Treatment and disposal of processing agents is time consuming and messy.

### How has Miracron addressed these limitations with the development of the FLEXCEL NX Ultra solution?

- Development of the patented KODAK Ultra Clean process
- Robust and reliable plate processing hardware
- Safe and efficient waste-water disposal

### KODAK Ultra Clean patented\* technology

- Natural-based, environmentally responsible additives
- Unique plate cleaning and maintenance processes
- Ensures long-lasting clean, consistent plate quality and reduces operator intervention
- Easy and safe disposal of inert by-products and reclaimed water

\*US Patents issued US 10,207,491, US 10,216,089, US 10,248,025 and US 10,324,378 for both processing agent and plate processing method

## KODAK Ultra Clean Technology Innovation



KODAK Ultra Clean Technology – Photopolymer stays suspended in water with no debris

Competitive water wash technology – photopolymer debris falls out of suspension and deposits on plates and processor

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## FLEXCEL NX Ultra Processing Agent

**What makes KODAK Ultra Clean Processing Agent unique compared to all other water wash solutions?**

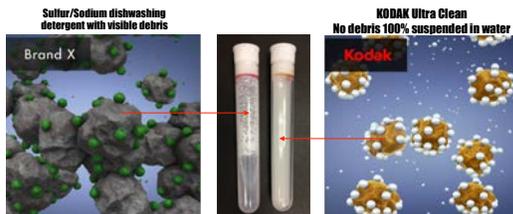
	Competitive Water Wash	NX Ultra Processing Agent
Processing agent	Sulfur/Sodium Dishwashing Detergent	KODAK Ultra Clean (Proprietary)
Fatty acid	Saturated	Unsaturated
Composition	Sodium/sulfur inorganic-based	Natural organic plant-based
Unexposed photopolymer reaction in washout process	Not easily dissolved or suspended in water, clumps together, and forms photopolymer debris	Easily dissolved and suspended in water and does not form photo polymer debris
Proof	Washout times are 2x longer and polymer debris is visible on processor and plates	Half the washout times with ease, at which photopolymer dissolved and suspended in water without any debris

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## Processing Agents

Reaction with unexposed photopolymer in washout process



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## Comparison of Aqueous Platemaking Processors

Published data	Remove plates		
	Processor	Plate Size	Washout Time (min)
Fuji	C-Touch 36/48	35x48	14
Asahi	AWP™ 4835 P	35x48	20
Kodak	NX Ultra 35	35x48	7

Why is this so important?

- Greatly enhanced productivity—more plates per shift.
- Reduced washout times result in:
  - Longer brush life and cleaner brushes
  - Less wear and tear on machine components
  - Significant reduction in residual polymer debris buildup in the processing environment.
- Extended time between system clean requirements

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## How Ultra Clean technology works....

- NX Ultra Processing Agent is preformulated
  - Easy loading
  - Easy refilling
- NX Ultra Processing Agent automatically metered
  - Guarantees consistent strength for every plate
- The washout solution is automatically mixed
  - initial filling, plate rinsing and for machine cleaning
- Process multiple format sizes
  - Adjusts replenishment levels
  - Maintain consistent percent solids
- Easy to use complete system



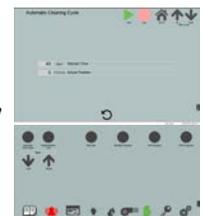
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## How Ultra Clean technology works....

Easy to use Automatic Operation

- Built in Preventive Maintenance
- Automatic Cleaning cycle
  - Cleans main washout brush, rinse brush and plate holding platen
- Push button tank controls
  - Automatic wash tank emptying
  - Automatic refilling



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### How Ultra Clean technology works....

- Primary washout solution
  - Circulated, temperature-controlled holding tank
- As each plate is processed
  - Washout solution is pumped and distributed evenly
  - Solution serves as a "lubricant" in the removal of unexposed polymer from the plate surface
- Filtration system recirculates washout solution



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### How NX Ultra Clean technology works....

- Final step in each washout cycle
  - FINAL RINSE with a solution consisting of fresh processing agent mixed with clean water.
- Removes any potential remaining debris from the plate surface
- Adds replenishment to maintain the working pH
- Keeps remaining debris suspended in the solution.
- Results in a clean processing environment
  - Extends the life of the equipment



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### Robust and Reliable Processing Hardware

- Hardware designed for very high uptime – very high volumes
  - Our first machine has crossed the 10,000 cycle threshold within a year.
- Innovative design washout brush configuration, rotation and brush pressure settings
  - Consistent plate to plate washout, minimal cleaning of brushes, and greatly extended washout brush life.
- Processor interior components have special coating
  - Reduced adhesion, leading to simpler, easier cleaning when required. Several hundred plates can be processed between system cleans.



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### Safe and efficient waste water disposal

- Simple and Safe waste stream - natural, organic-based components
- pH level that would be considered "safe" for disposal in most municipal waste streams
- Environmentally safe residual polymer suspended in water
- Simple and hassle free approach to waste water disposal
  - Waste stream pumped to an industry standard holding tote
  - Consolidated with other water waste streams (e.g. aqueous ink waste) in plant
  - Disposed of as a service outside of plant
  - Cost Effective
- Waste water disposal decoupled from plate production
  - Improves plate making productivity



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### A greater focus on sustainability



**High-performing flexo technology**  
that allows brands and printers to leverage more cost-effective and sustainable print processes.

**Highly differentiated flexo plates**  
that reduce waste generated during printing.

**A commitment to innovation**  
and the development of future products that combine highest quality, print efficiency and environmental stewardship.

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### Thank You

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