



# Ink Jet Technology

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Domino Digital Printing Solutions



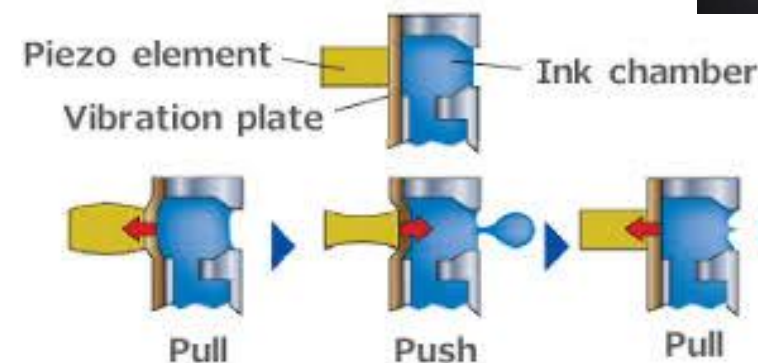
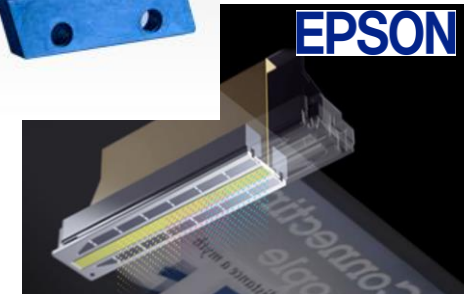
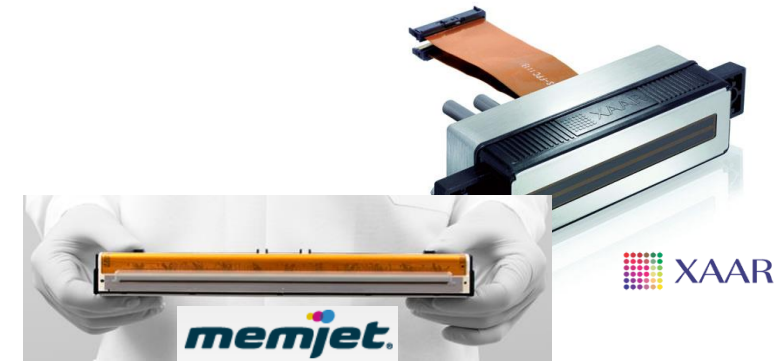
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# Agenda

- Piezo Ink Jet Characteristics
- Digital Label Printing Applications
- Requirements for Ink Jet Performance
- Advantages

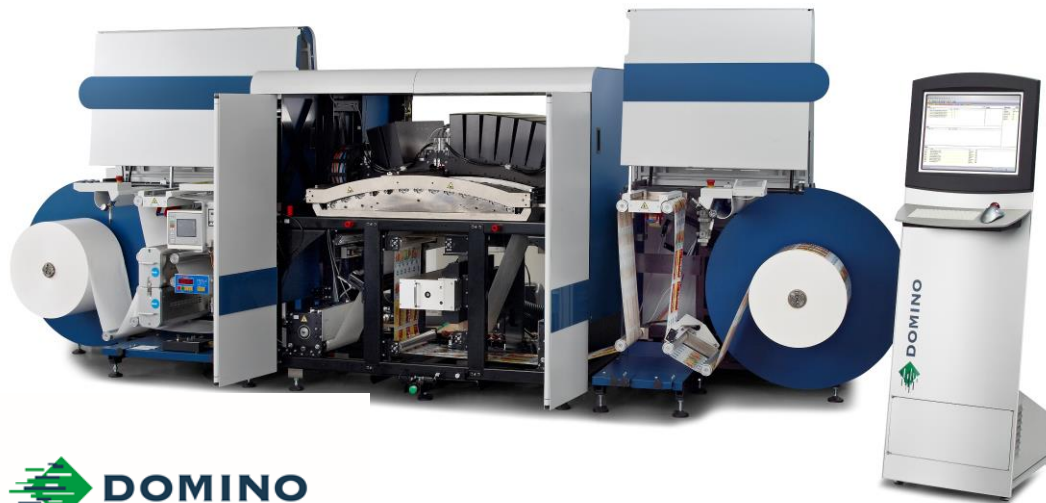
# Ink Jet Technology: Overview

- **Multiple ink jet technologies**
  - Many different applications
  - Direct to product non-contact technology
- **Piezo drop on demand ink jet**
  - Used for label printing
  - Electrical charge deflects piezo element to cause ink drop to eject from a nozzle
  - Integration of multiple print head modules
  - Label press can have over 30,000 nozzles
  - High Resolution
  - Suitable for UV-curable and aqueous inks
  - Compact design



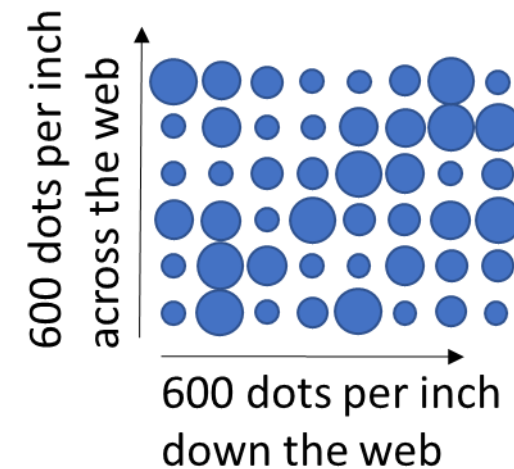
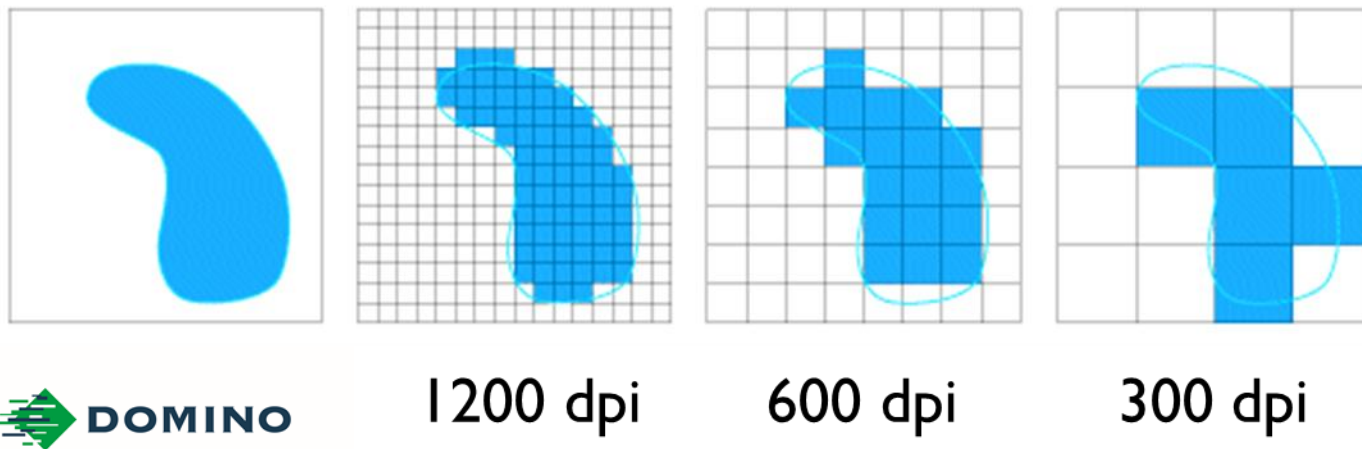
# Ink Jet Digital Press

Each 333mm print bar includes three Kyocera ink jet modules and prints one colour



# Piezo Ink Jet Technology: Print Resolution

- Print resolution is quoted as drops per inch or dpi
- Ink jet involves printing drops that coalesce or join together
- The higher the dpi the finer the detail subject to flow characteristics of the media
- More dpi means more ink jet nozzles to maintain
- In addition to dpi, most print heads can print multiple different drop sizes

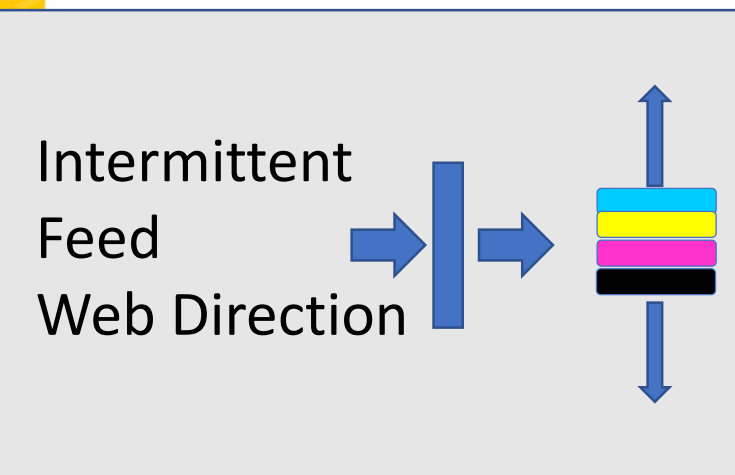
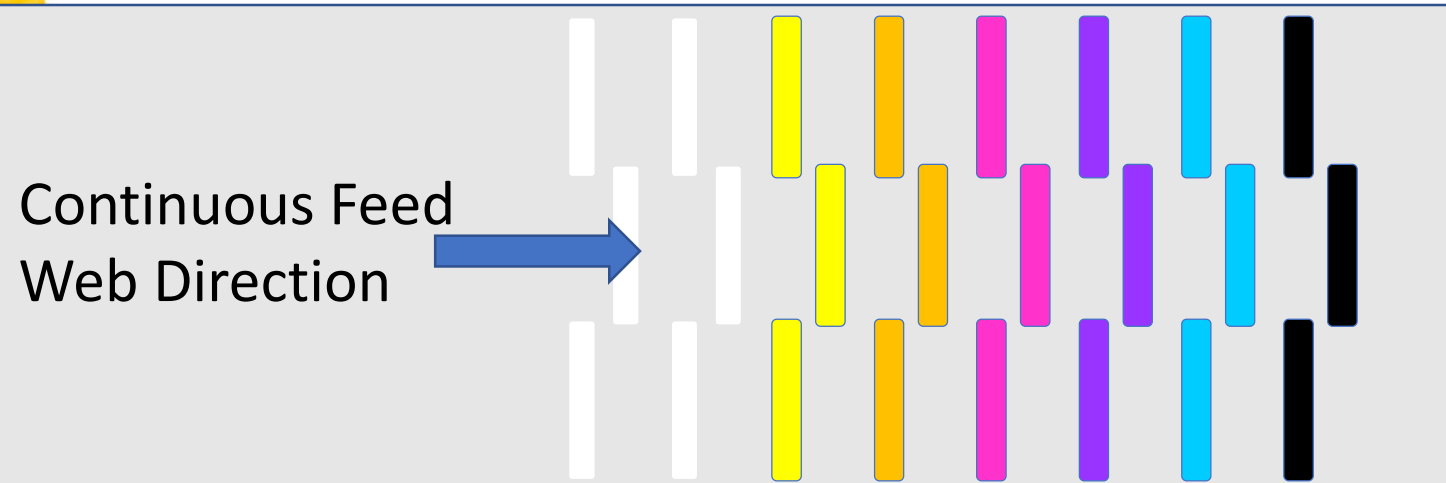


# Piezo Ink Jet Technology: History

- Wide format scanning available early 1990's
- 1<sup>st</sup> generation digital inkjet was launched in 2003
  - 300 dpi
  - Agfa
- 2<sup>nd</sup> generation digital inkjet was launched in 2008
  - 360dpi
  - Nilpeter, Jetrion, Durst, Stork + others
- 3<sup>rd</sup> generation digital inkjet launched circa 2012
  - 600 – 720dpi
  - Domino, Screen and others
- 4<sup>th</sup> generation, digital ink jet being launched circa 2017
  - 1200dpi resolution, Gallus, Durst



# Continuous v's Intermittent Systems



- Higher productivity typically  $>50\text{m/m}$  versus  $<5\text{m/m}$ 
  - Can be reel to reel, with in-line finishing or hybrid press
- UV-curable inks
- Lower up-front Investment
- Simple to operate and maintain
- Can use water-based inks



# Ink Jet Embellishment

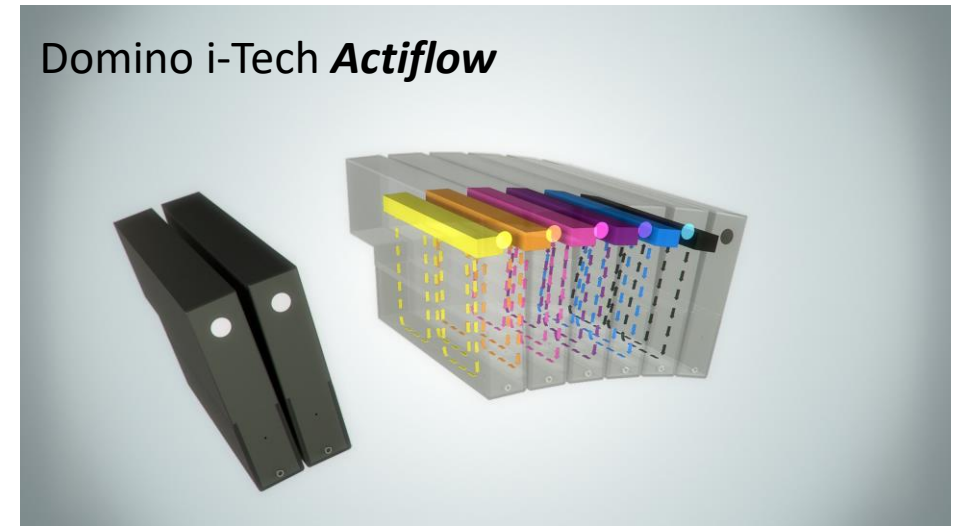
- Rotary Screen white replacement
  - 50 m/min, fine detail through to solids in one process
- Digital Metallic
  - Ink jet printing cold foil adhesive @ 75 m/min
  - Ink jet printable metallic inks
- Digital Varnishing
  - Matt and gloss variable print effects
- Textured Effects
  - Use digital inkjet white to create texture on plain papers





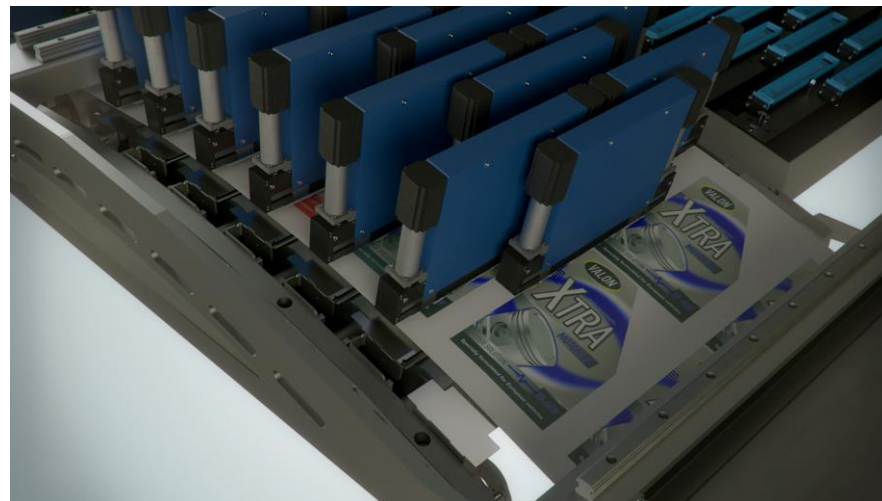
# Ink Jet Performance

- **How to maintain >20,000 nozzles?**
  - No diverted or missing jets
  - Managing heavily pigmented white ink
  - Higher the resolution the more nozzles to manage
- Solutions
  - Continuous ink recirculation e.g. *ActiFlow*
  - White ink mixing system to maintain pigment dispersion
  - Automated cleaning and capping solution e.g. *CleanCap*
  - Nozzle redundancy



# Ink Jet Performance

- **How to Stitch Print Heads Seamlessly?**
  - No white line
- Solutions
  - Micro-control over ink jet module positions e.g. *StitchLink*
  - Temperature control



Domino i-Tech *StitchLink*

# Ink Jet Advantages

- Higher printing speeds >50m/m for continuous feed
- Higher reliability with fewer moving parts
- Maintains colour consistency well over time and usage
- Print quality is at least as good as flexo
- Efficient in-line finishing and hybrid printing options
- UV-Curable inks with similar properties to flexo inks
  - Vibrant colours
  - Good adhesion, abrasion resistance and light fastness
    - Durable labels
    - Often no need to prime or varnish
- High opacity white, often used as a substitute for rotary screen printing
  - Personal care labels
- Embellishments e.g. cold foiling and spot varnishing



# Thank You

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