# Memjet High Speed Inkjet

Update

20230706

# Supported by over 200 employees, in 5 cities, across 4 continents…

# *Who is Memjet?*

*… and manufacturing partners all over the world*

# A closer Look at Memjet

Over
**15,000**
Systems installed

**20+**
Years of R&D

**Thousands**
of patents granted

## Serving a wide range of OEM print applications

# Extending Memjet Technology Beyond Printing

## Memjet Inkjet

**VersaPass**

**DuraFlex**

**DuraBolt**

**DuraLink**

## Memjet Defense

**Sensors**

**Electronics Packaging**

**Software**

**Comms Systems**

## Memjet Solar

**Cell Equipment**

**Process Development**

**Facilities Setup**

**Data Management**

## Memjet Bio-Tech

**Wafer Scale Design**

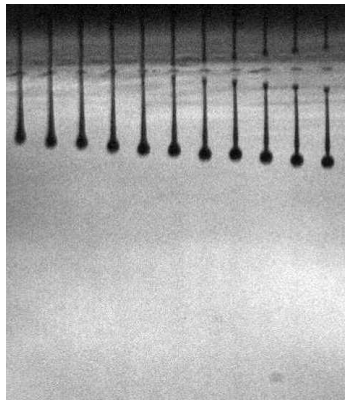
**Sensor Development**

**Data Management**

**Design and Manufacturing**

| | | |
|---|---|---|
| Printheads | Sensors | Panels |
| Dye-Based Ink | Sensor Packaging | Perovskite Equip |
| Bespoke Engines | Electronic Systems | Data Management |
| Modules | | Consumables |

# Memjet Advanced Thermal Inkjet Printhead Technology



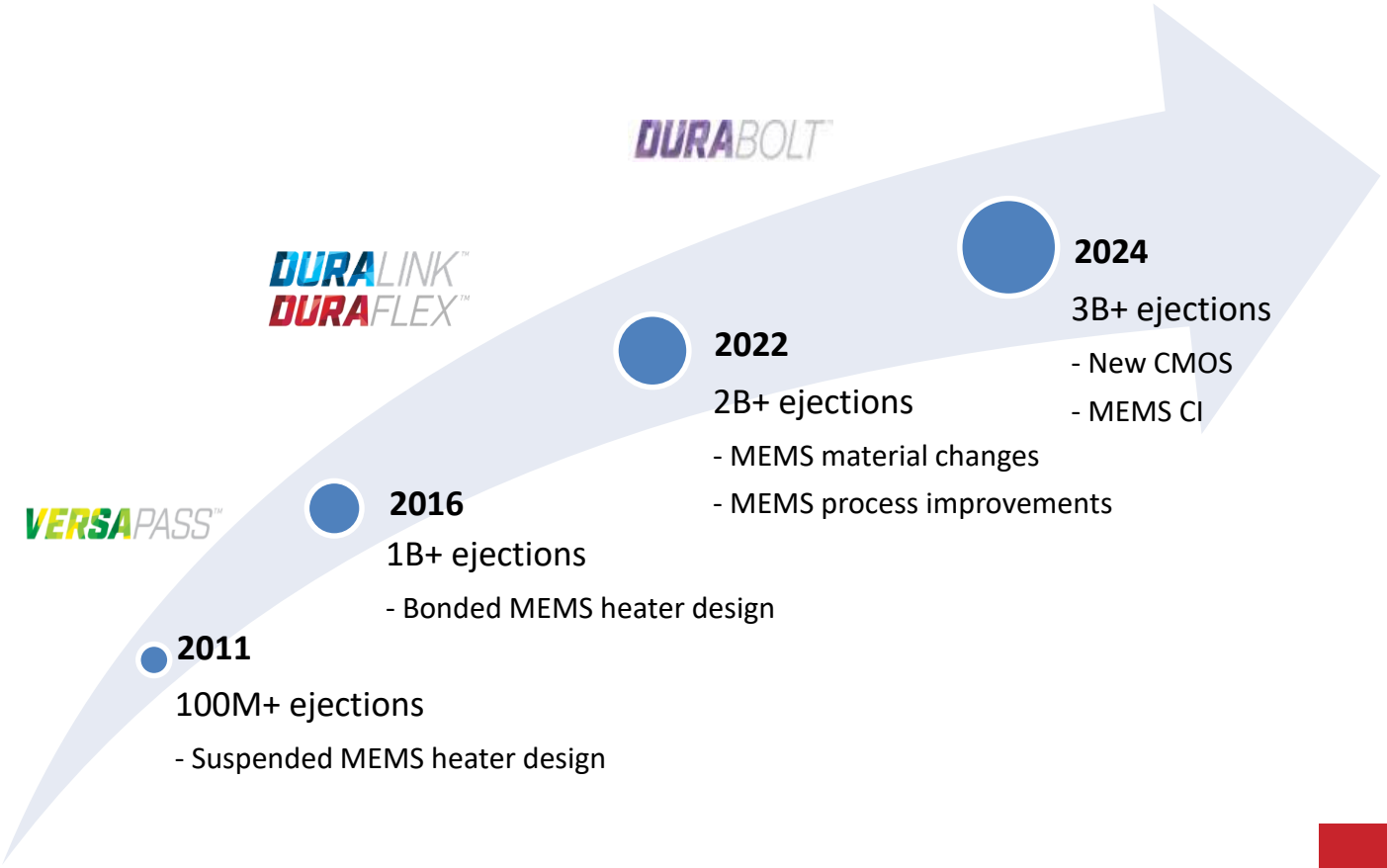
**MEMS design results in crip detail and uniform refill**

- Symmetrical ink feed
- Ink path redundancy
- Consistent drop size and drop breakaway

**FPGA design allows direct dot level control**

- No compression
- Sophisticated halftones
- Direct control of color management

**Nozzle Lifetime Improvement**



# Recent Press Releases

April 19, 2023

### MEMJET ANNOUNCES THE LAUNCH OF DURABOLT: A READY-TO-DEPLOY PRINT SOLUTION

SAN DIEGO — April 19, 2023 — Memjet has today announced the launch of a turnkey printing solution, the DuraBolt 325C PrintEngine. This high-volume, integrated print engine is augmented by a sophisticated Digital Front End (DFE) that streamlines interaction between…

READ MORE

April 24, 2023

### MEMJET ANNOUNCES THE LAUNCH OF THE DURABOLT PRINTBAR AND MEMJET DIRECT

SAN DIEGO — April 24, 2023 — Memjet has today announced the launch of a wide web monochrome printing solution called the DuraBolt PrintBar, plus the formation of a dedicated, direct-to-printer sales and integration service called Memjet Direct. These initiatives…

READ MORE

May 4, 2023

### MEMJET OPENS A STATE-OF-THE-ART INK MANUFACTURING PLANT IN SYDNEY

SAN DIEGO — May 4, 2023 — Memjet has today announced the opening of a state-of-the-art dye-based ink manufacturing plant in Sydney, Australia. The new facility will produce Memjet's advanced ink formulations in a quality-controlled, automated production environment. Memjet's new…

READ MORE

https://www.memjet.com/press-releases/

# Extending Memjet's Range of Printing Platforms with Two New Solutions Launched This Year

**New Memjet Solutions 2023**

VERSAPASS™

DURAFLEX™

**CMYK**

DURABOLT PRINTENGINE

DURALINK™

**Monochrome 1000 fpm**

DURABOLT PrintBar

Running Costs

~5k AMPV

~250Kn AMPV

~4 Mn AMPV

~10 Mn AMPV

*Desk/Benchtop/ Wide Format*

*Benchtop/Wide Format/ Light Production*

*Medium Production*

*Heavy Production*

*Ultra-Heavy Production*

Productivity / Average Monthly Print Volume (AMPV)

# Memjet's Thinktank & Industry Roundtable…. Imperatives

**De-Risk the entry barriers to market**

- Provide a turn-key solution ready to deploy, take the investing \ NRE out of the equation
- Solution with no R&D barriers to commercialization
- Completive scalable solution to reach different price \ penetration points

**Ensure cross-platform functionality**

- Cross Functional systems for all applications
  - Commercial, Packaging, Direct to Film
- One service team for all applications
  - Hardware, software, workflow, controller, HMI, curing \ drying

**Application Expexpertise**

- Commercial, transactional, book, direct-mail, corrugated, folding carton
- Chemical Stack recipes tied to manufacturing expertise to complete the intended product

**Operator \ Labor force ease of use \ Cross Functional**

- Develop a solution that recognizes the changes in the labor market
  - Operator vs Technician
  - Virtual support and maintenance with cloud based KPIs \ dashboard and support
- Develop one user experience across all verticals in print

DuraBolt 650 PrintBar

# DuraBolt PrintBar Imprinting Solution

**High speed** monochrome imprinting with up to **38.25” print width**

**1600 dpi** Print Quality :

- Enables “invisible marketing” by
  - making variable **visually** look **like analog**
  - enabling bulk mailings to look like **custom** printed items
- Potential for higher direct mail **response** rates to bulk mailing

**Automated** controls:

- **Reduced manpower** needs with automated head cleaning
- System controls **operated by lead press operator**
- Digital positioning

Small **Footprint & Reliability**:

- Enables printing to be **placed on more equipment**
- Mounted **onto** your **press or finishing** equipment

High **throughput**:

- Fast and reliable press **make ready**
- **Less down time** related to inkjet issues
- Print **speeds up to 980 fpm**

**Monochrome**
**DuraBolt 650 PrintBar**

# DuraBolt PrintBar

## Designed and Built for Production Digital

1. ***Production Capable***
   - Purpose-built for high volume use
   - Up to 960 fpm at 1600x790 dpi
   - Highly productive / high ROI
   - Monochrome with Color Options

2. ***Outstanding Print Quality***
   - 1600 dpi with 10x nozzle redundancy
   - Smooth Vignettes and Kanji characters
   - Outstanding and consistent quality

3. ***Flexible Implementation***
   - 13-, 26-, and 39-inch print widths
   - Spot or Process color options
   - ModBus TCP/IP integration

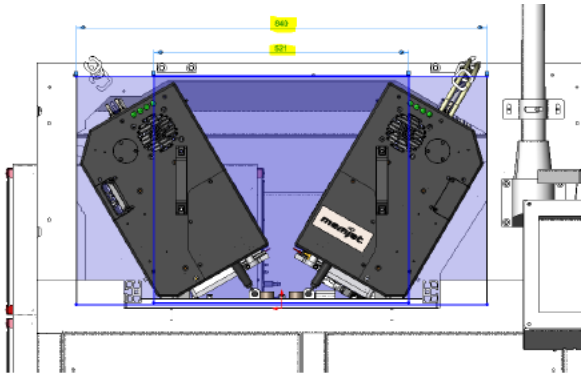


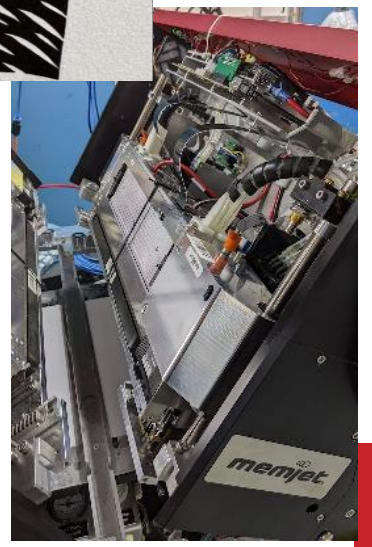
Figure 3 : Bar Print Mechanism - Side View

4. ***Rapid Installation***
   - Complete Integrated Solution
   - Includes print module, DFE, control architecture
   - Seamless connection to additional components

5. ***Easy To Use***
   - Highly integrated workflow and process control
   - Automated maintenance systems
   - Integrated with Memjet Could Services 2.0

# DuraBolt PrintBar Productivity Features

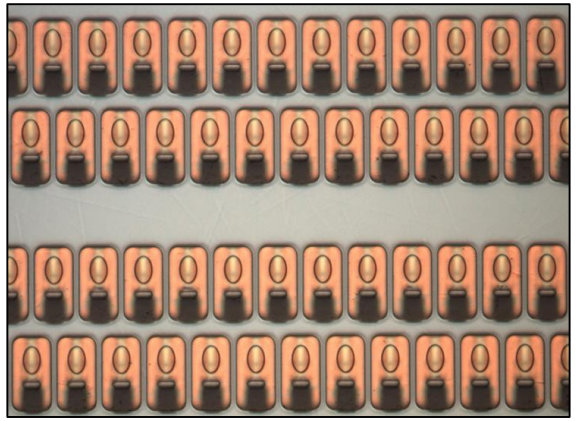
| Feature | Intended Impact |
|---|---|
| ***10X Nozzle redundancy*** | *Fewer print issues related to paper dust*<br>*No need to slow down to enable jet compensation.* |
| ***Print Head Automated cleaning in less than 2 minutes*** | *Rapid recovery from PQ issues caused by paper dust.* |
| ***Nozzle cleaning during print pause and print start cycles*** | *Reduces potential for Print Defects upon start up or re-start* |
| ***Print Module internal air flow*** | *Minimizes opportunity for ink droplets to create print defects.* |
| ***Print Head replacement cycle in about 5 minutes*** | *Quick and reliable print head replacement.* |
| ***Electronic Head Gap Positioning*** | *No need to dial in print head upon start up.* |
| ***Web Wide Bar*** | *No lane adjustments needed.*<br>*Reduced press set up time* |
| ***Cold Start to Ready in less than 10 minutes*** | *Reduces power needs during press set up and overnight.* |
| ***Operator or Local Maintenance with Remote MJ Monitoring*** | *No need to call in Service Teams – manage it on your own*<br>*Maintain up-time* |



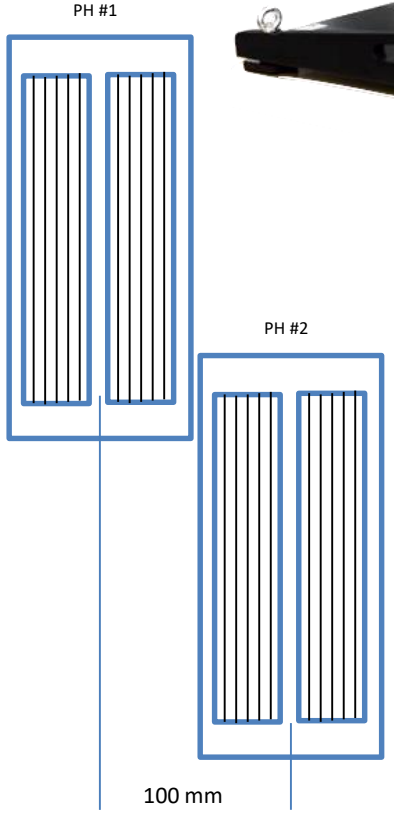
# DuraBolt Bar Head Design

Built with 12.77 inch print heads
Each print head contains Two (2) silicon strips of nozzles
Each silicon strip has 5 active nozzle rows
Each print head has up to 204,320 active nozzles
1 M wide bar has 612,960 active nozzles
Built in Nozzle Redundancy = 10 X
Advanced Thermal inkjet Technology
Long life – up to 500 L/print head

MEMS/CMOS Jetting



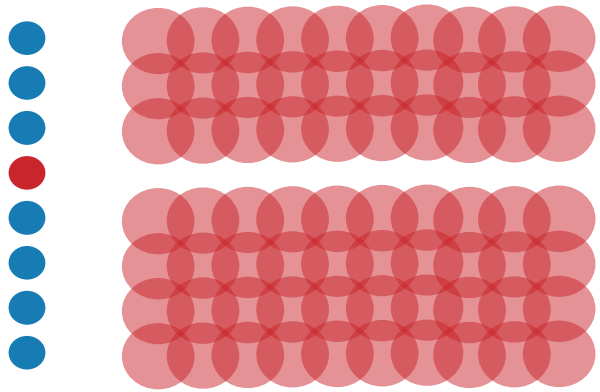
5 arrays per Silicon Strip



Assembled 26-inch-wide Print Module

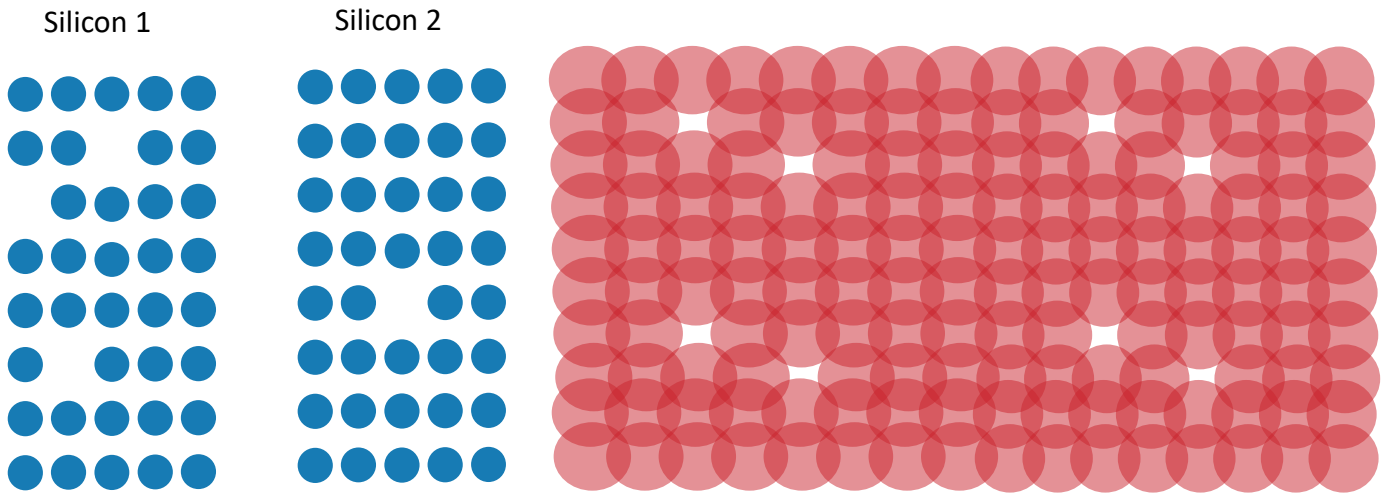
# Printhead Nozzle Redundancy – benefits of 10X nozzle redundency

extends production time between nozzle cleanings



Traditional Inkjet

Single Jet malfunction creates
White Line Print Defect




Memjet DuraBolt 10X Nozzle Redundancy

No streak due to built in redundancy-
*even with more than one nozzle out*

# System Specifications

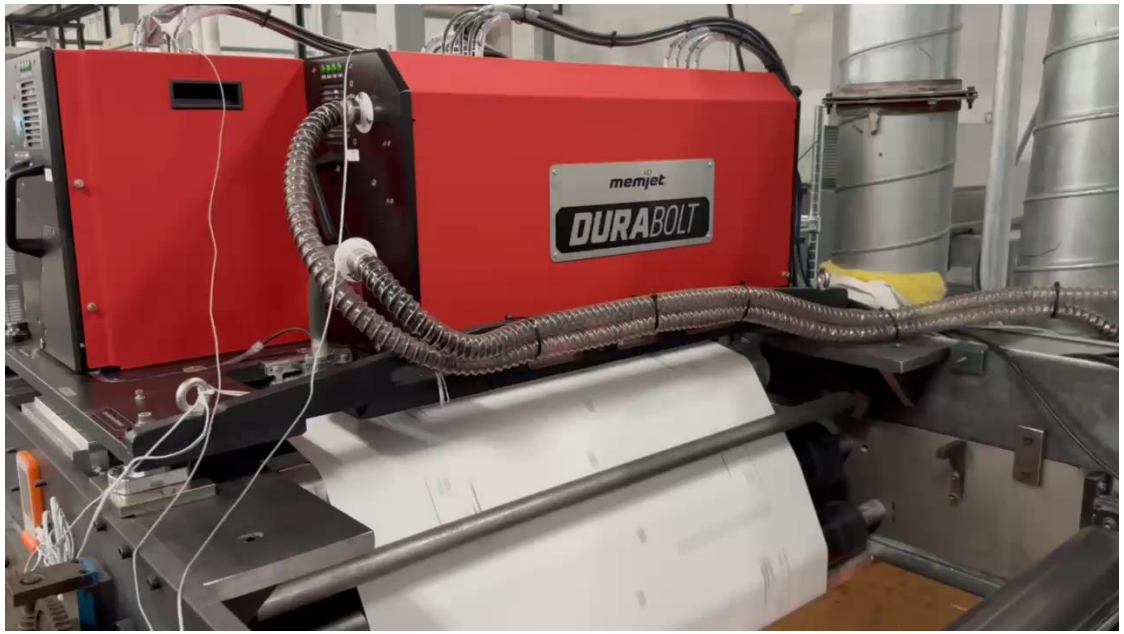
| Parameter | Specification |
|---|---|
| Monochrome printing | Black |
| Print width to Match the Press | 324 mm (12.77 inches)<br>645 mm (25.5 inches)<br>970 mm (38.25 inches) |
| Print Resolution | 1600 x 790 (Standard) |
| Print Speed | Up to 980 fpm |
| Nozzle redundancy | Up to 10X |
| Digital Front End | Memjet (Global Graphics)<br>Includes RIP, print control and link to press system |
| Down-web Footprint | 507 mm (20 inches) |
| Ink Type | Aqueous Pigmented |

| Parameter | Specification |
|---|---|
| Automated Maintenance (head cleaning and capping) | Included |
| Electronic Head Positioning | Included |
| Profile Library | Included |
| Simplex and Duplex printing | Included |
| Aerosol extraction | Included |
| Head-to-Head Stitching | Visual pattern |
| Print Position Adjustment | Digital from HMI |
| Splice detection and response | included |
| Environmental cooling | included |
| Optimized Dryer | Adphos Option available |

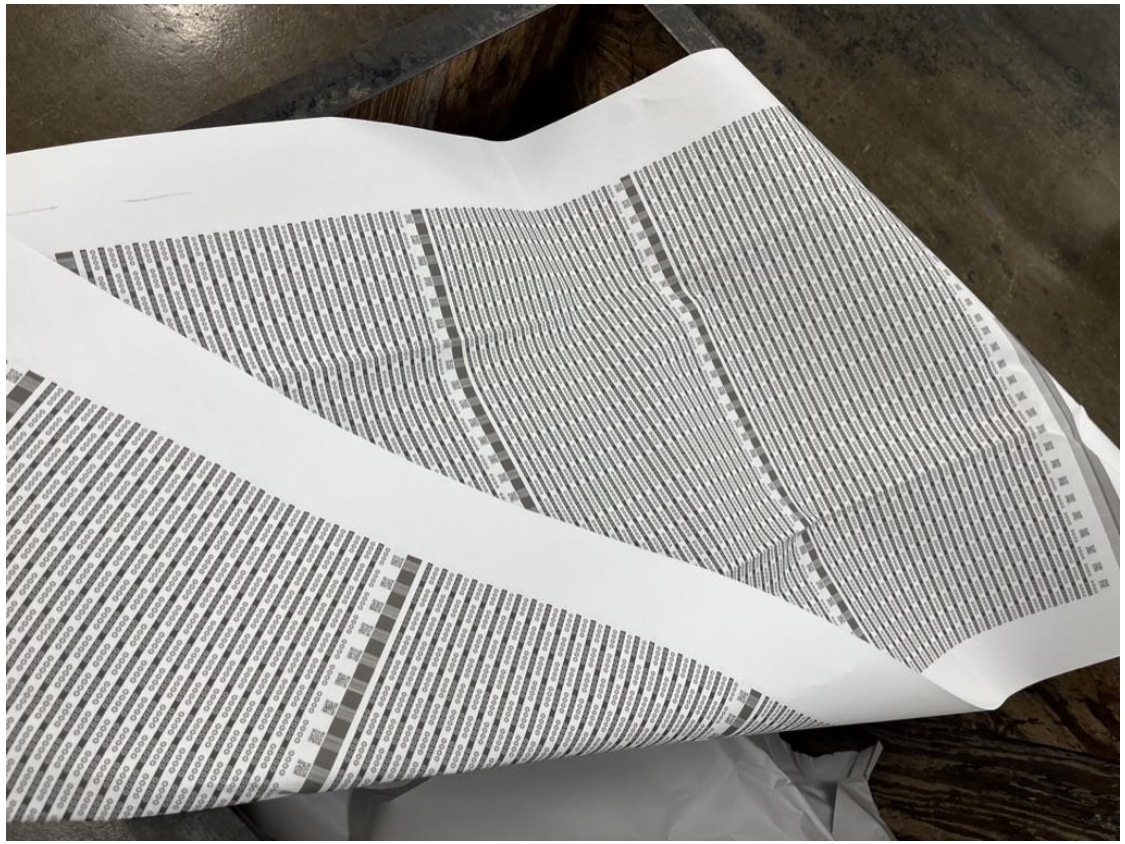
# DuraBolt 650 PrintBar in action

DuraBolt 650 PrintBar

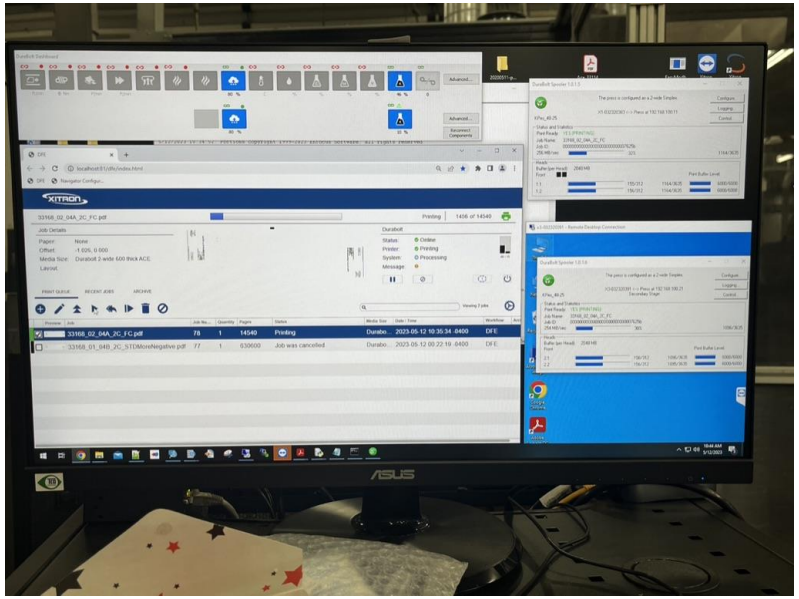
- Installed on i-Web drying towers
- Replaced 4 Kodak 6240 rails
- In-line with Offset press and finishing
- PDF workflow
- > 50% reduction in drying requirements
  - Some jobs ran with 90% reduction in drying requirements
- 25.5 inch print width
- Center justified
- Custom designed mount for precise drop placement
- Air conditioning and positive air flow to minimize down time during production runs
- > 10 minutes ready to print from cold start
- up to 8 hours between automated head wipes



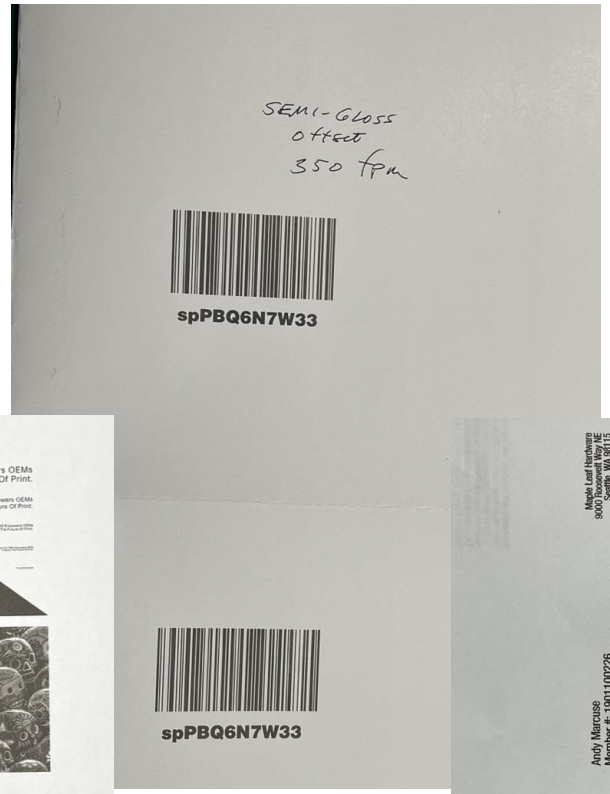
# Full Duplex Capability

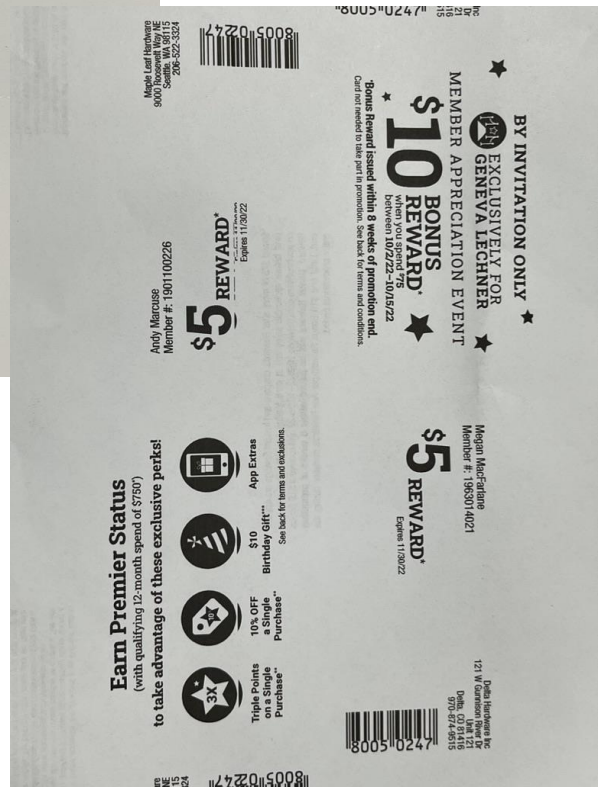


Front to back digital alignment
Data consistency (match) front and back
Single DFE controls data and inkjet printing
Data positioning saving for repeated jobs



# Consistent PQ (1600 x 790 dpi)





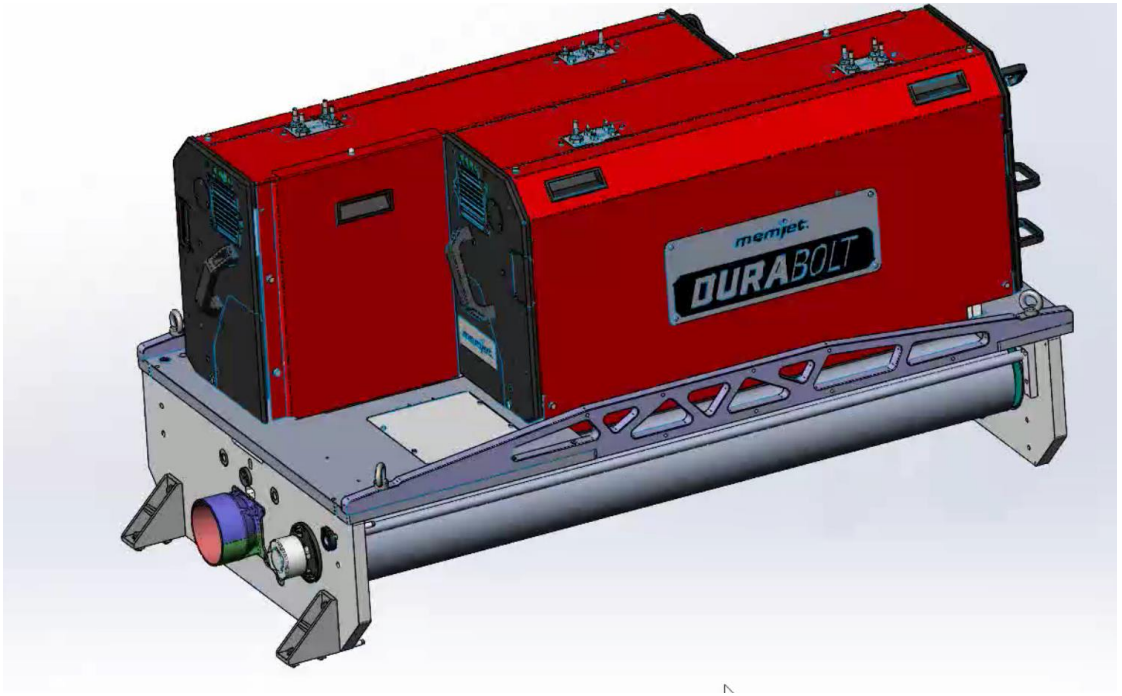

Variety of papers (offset stock)

# Live Jobs

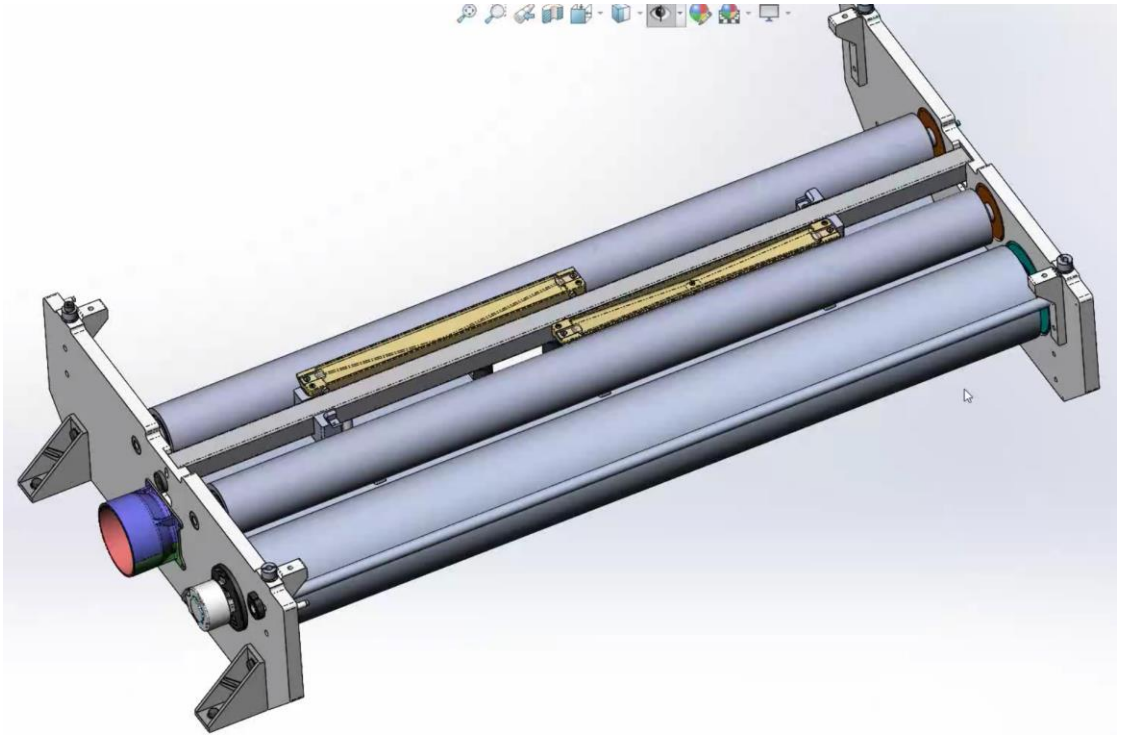
Active on-press
Matched position and speed to Litho
Offset satin finish media
Speed limited by complex finishing
Job run length about 84 hours

# Memjet Mounting

Memjet supplies mounting system incorporating precision positioning, precision rollers, encoder, waste spittoons to enable narrow paper, heat deflection and cooling systems.




650 DuraBolt Mount to fit onto Tower

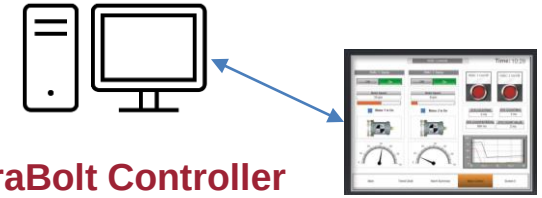


Detail of the lower Mount Portion.

# An Integrated Solution with powerful Process Control

***Enables rapid Press integration***

- Standard integrated components with optimized parameters
- Press interaction via ModBus PLC
- Print Enablement Library / Application Access



**DuraBolt Controller & RIP with HMI**

***Delivers straightforward user operation***

- Clear HMI integrated command structure
- Does not require extensive printing experience or expertise

**Print Engine**

Print system controls

Print data to jets

Ink supply

Diagnostics / Maintenance

**Bulk Ink Tank Monitor**

Monitor ink supply

Avoid ink out

Enable continuous operation

**Transport Interface**

Print ready commands to transports

Media path start/stop

Control ramps

**Dryer Interface**

Dryer power commands

Set profiles by job type

**Sensors and Controls**

Splice detect

Humidity

Spacing

Encoders

Top Of Form

More

**Memjet Cloud Services 2.0**

Utilization Reporting

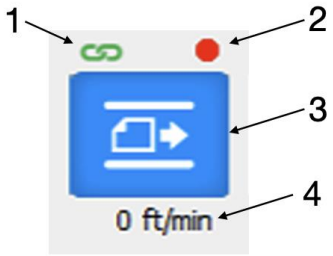
Performance Optimization

Trigger Based Notifications

# DuraBolt ModBus HMI Dashboard simplifies operator's activity

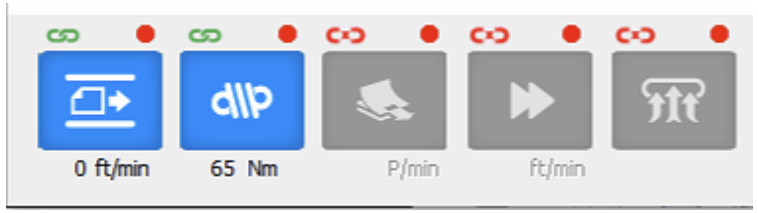
***Dashboard aggregates Controls and Status***

***Complements DFE***



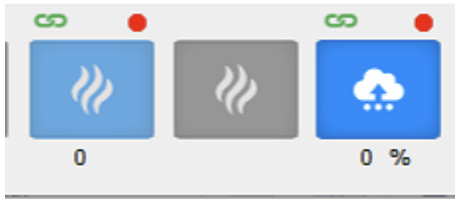

1. Connection status
2. On/Off status
3. On/Off switch (one click)
4. Set point or real-time status

## Media Transport Controls




- Media **motion** start/stop/speed
- Media **tension** control on/off/setting
- Sheet **feeder** start/stop/speed
- Media **vacuum** start/stop/speed
- Belt/web **suction** start/stop

## Dryer and Aerosol Controls

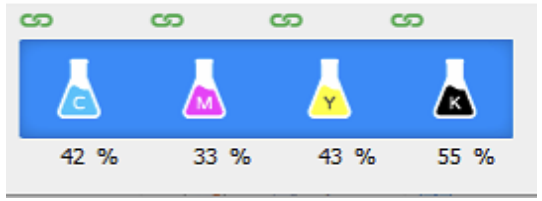



- **Dryer** 1 on/off/status
- **Dryer** 2 on/off/status
- **Aerosol** on/off/speed

## Temperature and Humidity Status

- **Temperature** degrees
- **Humidity** percent

## Bulk Ink Status




- **Ink** percent remaining by volume [**C, M, Y, K**]
- Warning ink is low
- Error (red) if ink is out

# Memjet Cloud Services (MCS) 2.0 Overview

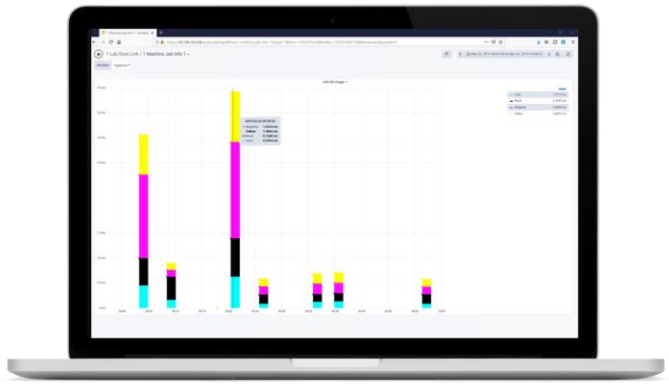
- ✓ **Simple**
- ✓ **Powerful**
- ✓ **Scalable**
- ✓ **Secure**

Monitors health of system
Does not have access to user data

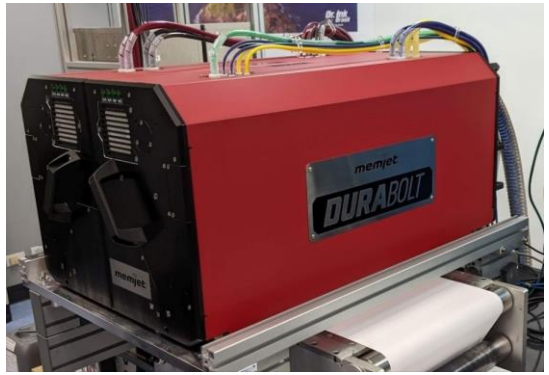
**Local MCS Agent**

**Cloud Service Database**

**Web Dashboard Access**



**Memjet Print Engine**



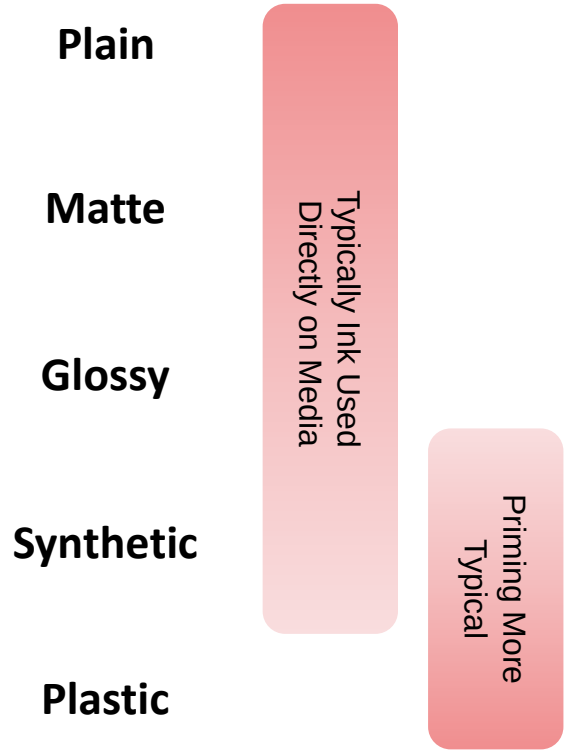

**Components**

1. **Print Engine** generates data
2. **MCS Agent** captures data
3. **Secure** transmission and **Cloud** storage
4. **Web Dashboards** deliver real-time insight!

- ➢ Insightful Business Data
- ➢ Real-Time Dashboards
- ➢ Visualizations
- ➢ Trigger-based Notifications

# Memjet Aqueous Pigment Ink Broad Application Latitude

- Two primary formulations
  - PZ – faster drying, and designed for indirect food contact
  - PR – standard ink for DuraBolt PrintBar systems
- Outstanding performance on most paper-based substrates
- Inkjet optimized media common for premium applications
- Limited drying to no drying depending on ink and media match
- Uses 50% less ink than Kodak imprinting systems
- No make-up, cleaning, or storage fluids
- Inks can be used with synthetic stocks such as Tyvek

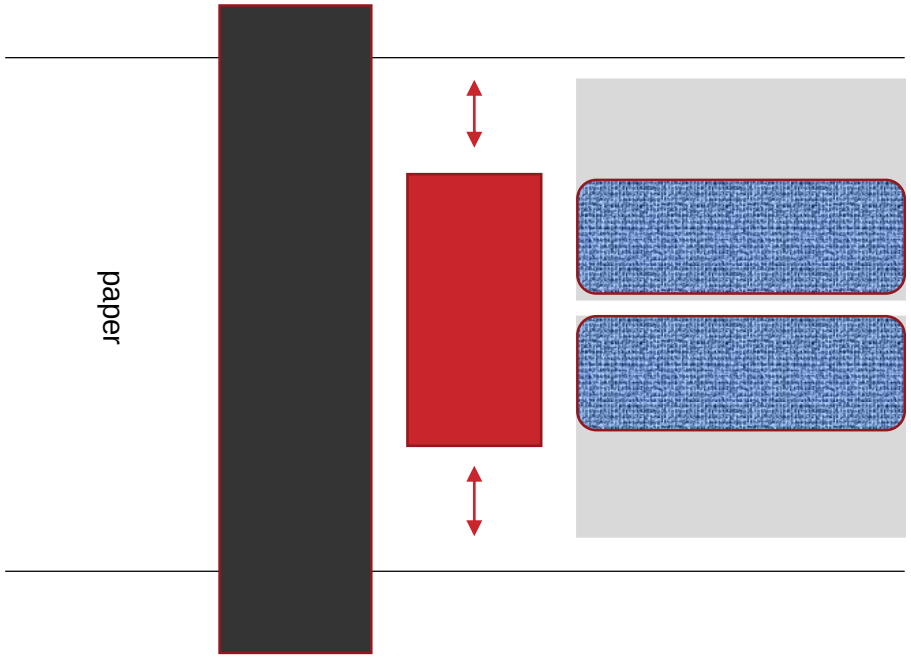


# Production Imprinting Web Color Option Using DuraBolt 325C PrintEngine

**Enable Black plus Process Color at 450 fpm**

- Process color module (12.77 inch wide)
- Enables printing of graphic images and business spot color
- CMYK matched inks for consistent color
- PQ consistent with DuraBolt PrintBar

- CMYK moveable 13 inch element covering adjacent lanes
- 4 rows of Nozzles per color (CMYK)
- Spot colors on the fly



# DuraBolt 325C PrintEngine

# DuraBolt 325C PrintEngine

## An Integrated CMYK Solution with a powerful Value Proposition

1. ***Outstanding Print Quality***
   - CMYK full color digital printing
   - 225 fpm at 1600x1280dpi
2. ***Production Capable***
   - Purpose-built for high volume use
   - Up to 450 fpm
3. ***Small and Highly Flexible***
   - 13 inch (324 mm) print width
   - Compact flexible design
4. ***Rapid Integration***
   - Integrated process controls
   - Seamless connection to additional components
5. ***Easy To Use***
   - Designed for ease of operation
   - Does not require highly skilled labor

**CMYK PrintEngine Launched Q2 2023**

# *Leveraging Memjet's Leading Printhead Technology*

1600 dpi printing

Utilizing our proven proprietary "ThurderBolt" printhead

12.8" print width (A3)

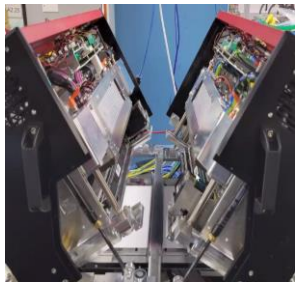
Using 2 printheads for CMYK PrintEngine

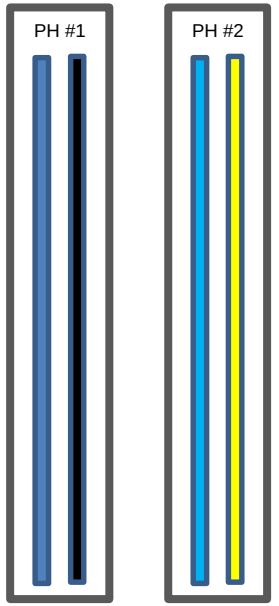
- Built in redundancy of 4x per color
- Outstanding solid uniformity
- Electronic calibration of color-color registration

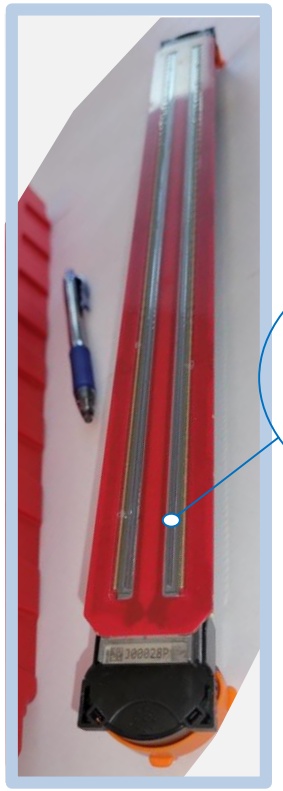
PrintBar uses a higher density nozzle structure to achieve 10x monochrome redundancy at 950fpm

Result is outstanding and consistent print quality

**DuraBolt 325C**
**Color Distribution**
**Over Two Printheads**

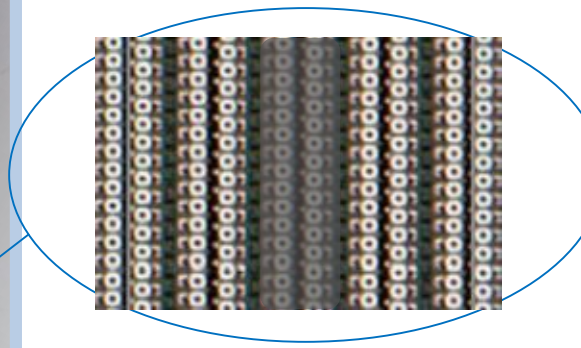




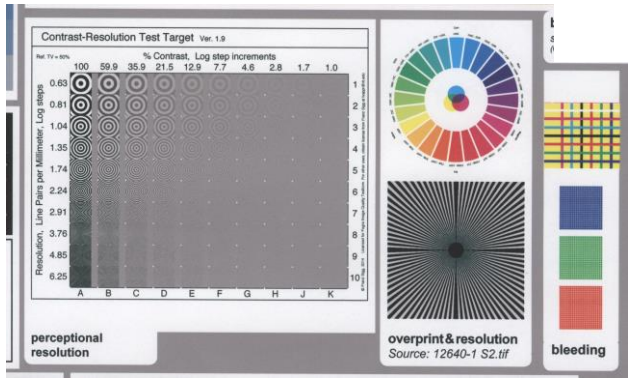
Thunderbolt
A3 (13") Printhead

**MEMS/CMOS Jetting**
**4 Nozzle Row Sets**
**for each Color in 325C**



# DuraBolt delivers outstanding print quality

*Extreme sharpness and text detail…*




*Highly accurate color-to-color registration…*

*Excellent gradients and shading…*

*Impressive solid uniformity without streaks or die boundaries…*

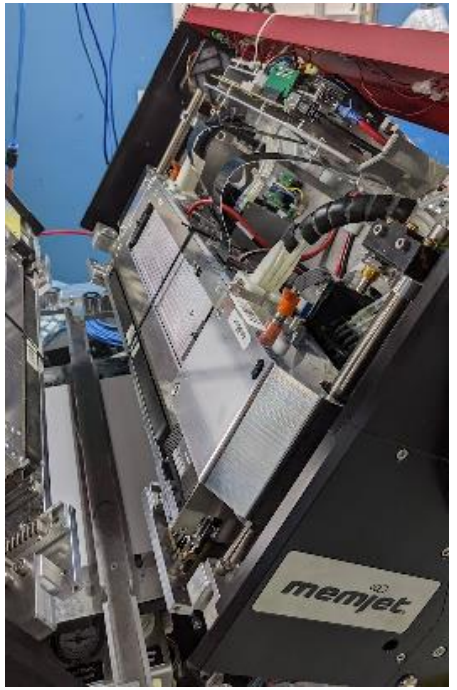
*Outstanding image detail and resolution…*

*Superb color gamut and tone reproduction…*

***Delivers consistent outstanding print quality without pausing or maintenance cycles for thousands of prints!***

# DuraBolt PrintEngine for Medium to High Print Volumes

| Feature | Intended Impact |
|---|---|
| ***Robust housing and components*** | *Motors, pumps, and internals built for extended runs and multi-shift use* |
| ***Factory aligned registration*** | *Great image quality and color-to-color registration – simple to maintain after printhead change* |
| ***Rapid start up cycle*** | *Fast time to output; low power consumption between shifts* |
| ***Automated printhead positioning*** | *Printhead height automatically set; electronically controlled by job profile* |
| ***4X nozzle redundancy*** | *Greater environmental tolerance; supports longer runs* |
| ***Aerosol extraction system*** | *Dependable whether light or heavy ink coverage* |
| ***Automated printhead maintenance*** | *Retain image quality job-to-job with less than 1min cleaning cycle time* |
| | *Quick and easy print head replacement in* |



Next Steps?

memjet