WE ARE R&D

Technical Capabilities

Using premium technology to expand - and win - new markets.

- *THE ULTIMATE PRINTING PLATFORM*

- *THE ULTIMATE TEAM OF EXPERTS*

memjet®

Beautiful Precision, Simplicity, and Affordability.

CONTENTS:

All New Technology. Endless Potential. 3

Development Steps for a Printing Platform and Ultimate Print System 4
WAFER, INK, PRINTHEAD PROCESS, EQUIPMENT, PRINTHEAD MODULE

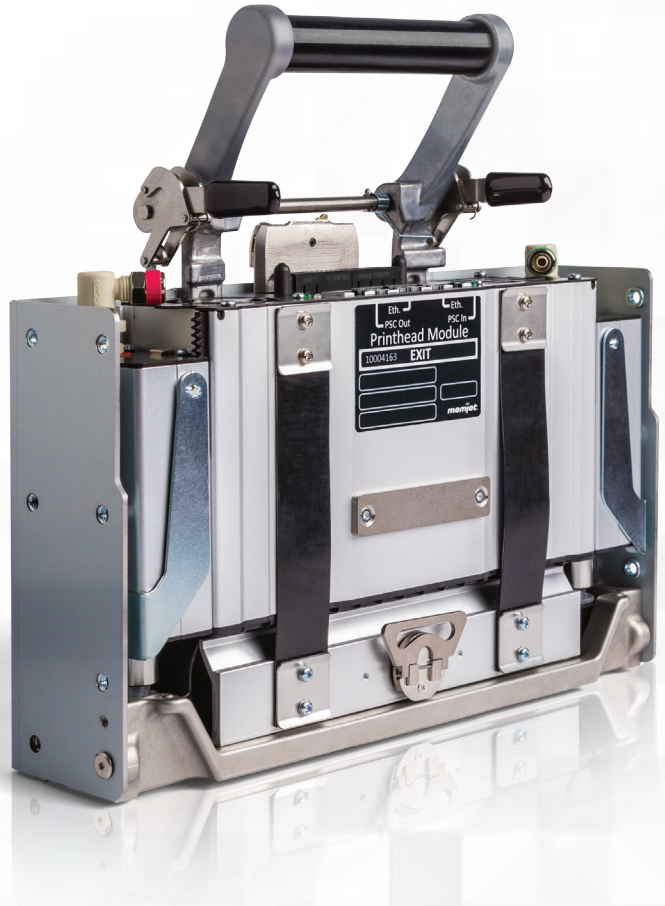
Reliability Testing 9
WRITING SYSTEMS, APPLICATION ENGINEERING

Power to The OEM 11

WE ARE R&D

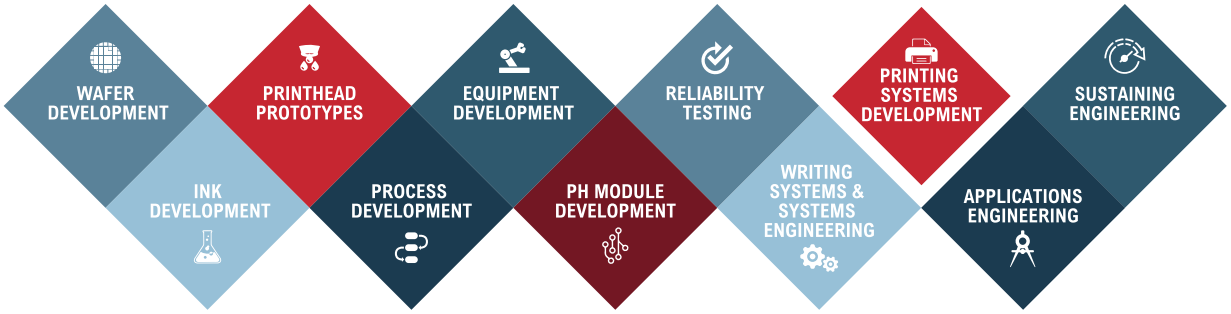
ALL NEW TECHNOLOGY. ENDLESS POTENTIAL

When we develop new technologies at Memjet®, it requires a team of talented experts including ink chemists, leaders in fluidics and writing systems, software specialists, image processing technicians, chip designers, and more. Complex engineering demands a team approach. For projects to succeed, a team's collective strengths must be utilized.



DEVELOPMENT STEPS FOR A PRINTING PLATFORM AND ULTIMATE PRINT SYSTEM

There are 11 basic steps we go through to design a print platform like DuraLink® or DuraFlex™. The first step is the development of wafers to create Integrated Circuits (ICs). Memjet's engineers and physicists create highly integrated Application-specific ICs (ASICs) with a custom image processing pipeline, as well as developing specialized inks that complement its printhead developments. Printhead prototypes are created using these custom printhead ICs, which lead to Process and Equipment Development. The printhead module is the heart of print quality, requiring Reliability Testing and Writing Systems and Systems Engineering. The OEM comes in at step 9, Printing Systems Development, where they develop their product. In this phase we provide Applications Engineering support and once the product is launched, we provide ongoing support through our Sustaining Engineering team.

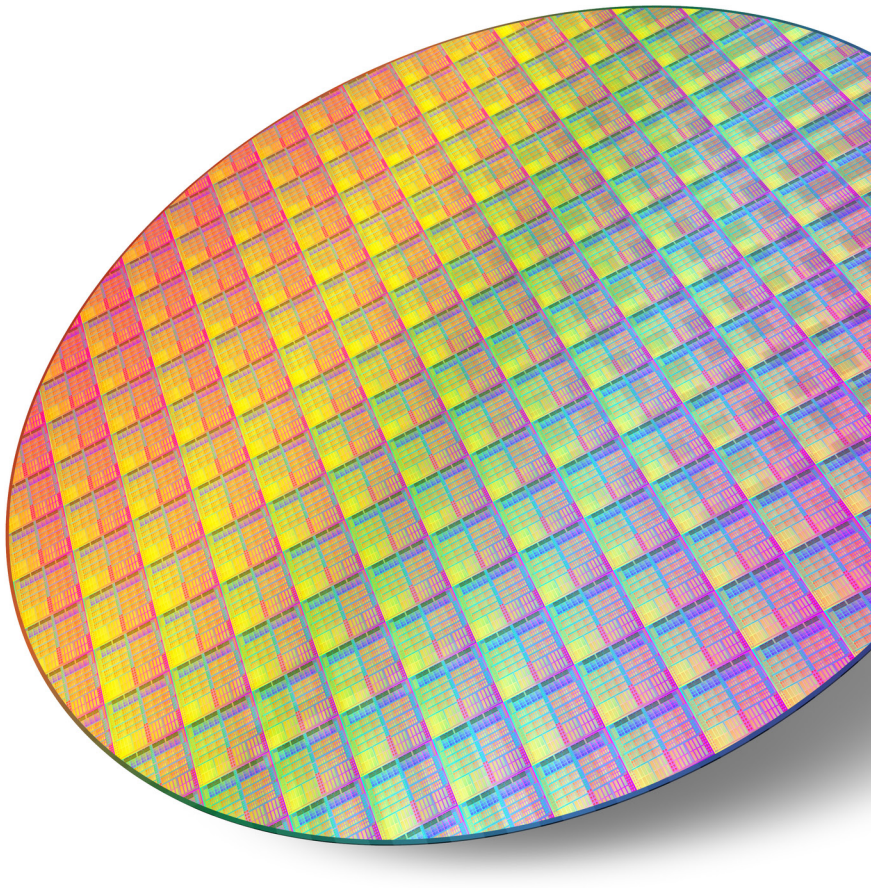


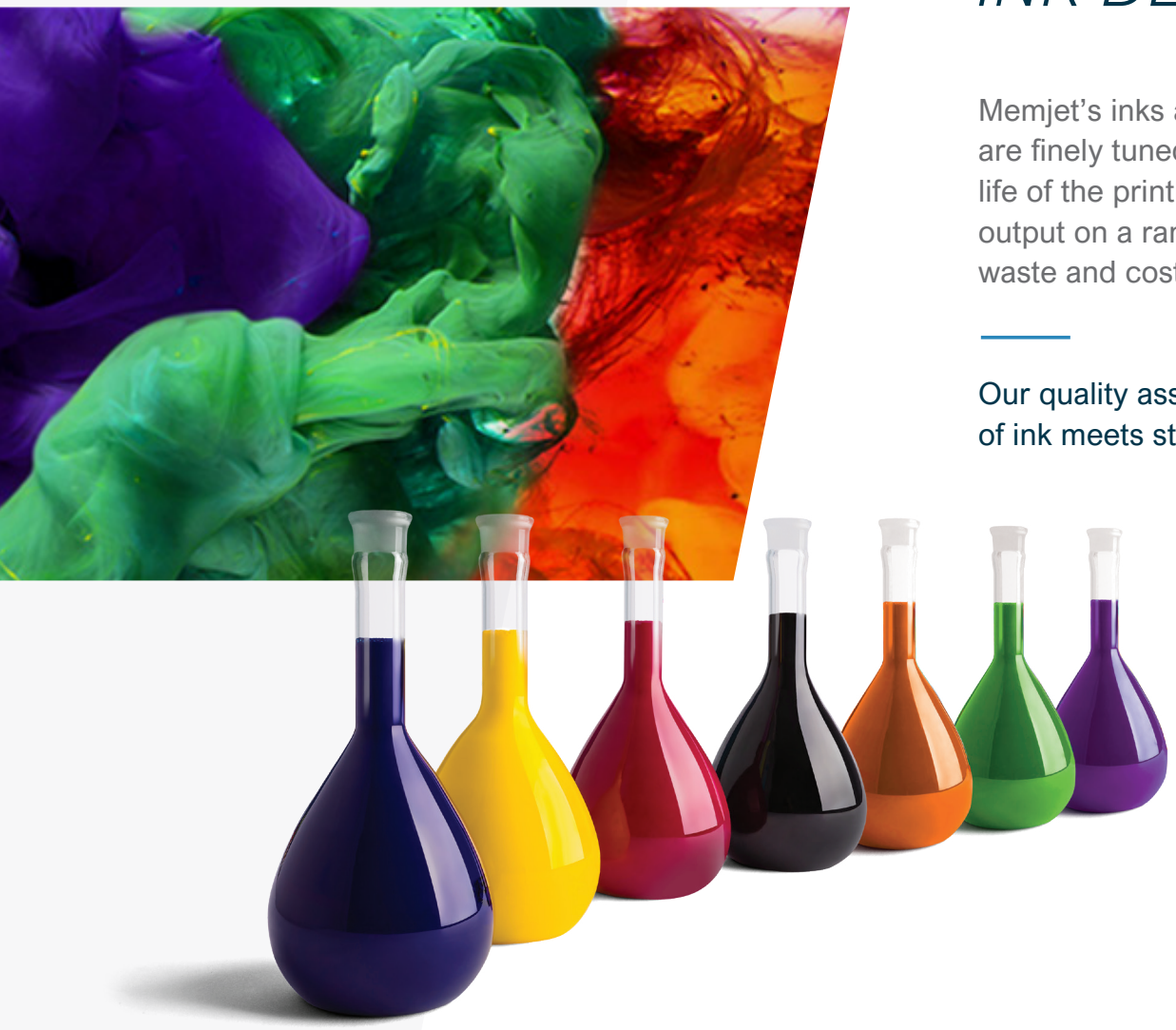
WAFER DEVELOPMENT

Memjet uses Microelectromechanical Systems (MEMS) processes in the fabrication of our printheads, enabling the creation of the tiny nozzles and drop-ejection system.

Our robust design and development methodology have enabled us to achieve a strong track record of delivering sophisticated IC designs that work the first time.

The process of wafer development does not stop at the creation of logic and masks used to develop our wafers. Complex design requires complex validation and testing systems to verify the design intent has faithfully and reliably been implemented. This requires custom test systems to verify logic, as the existing function wafer scale test systems can only verify simple test structures and not the full logic implementation. These test systems make their way through the life of the wafer design into manufacturing. Every die on every wafer is performance tested and the output stored in a database. This information is used by our manufacturing equipment to pick dies to be placed onto a printhead.





INK DEVELOPMENT

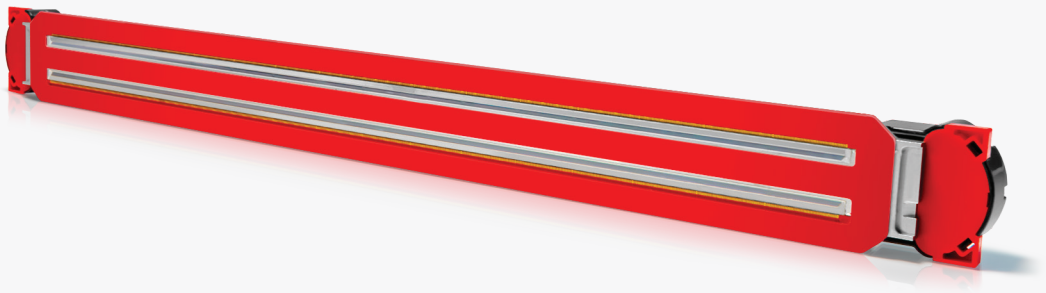
Memjet's inks are designed by Memjet's team of ink chemists and are finely tuned to jet with extremely high reliability throughout the life of the printhead, while also providing consistently high-quality output on a range of media. By using Memjet-designed inks, waste and cost are minimized for the end user.

Our quality assurance specialists make sure that every batch of ink meets strict quality and cleanliness standards.

PRINTHEAD PROTOTYPES

The printhead design process has a large design and verification process, and it is driven by the needs of our customers and the expected requirements of the ever-changing print industry. A prototype printhead design will start by examining the operational requirements of the die to maintain best quality and performance. We then consider the requirements of the target market and printing systems that will utilize our new printhead product.

Once we have the product definition in place, a team of designers is assembled covering everything from microfluidic design and simulation at the printhead die level right through to our industrial designers to create the look and feel we want our product to have. Almost every engineering and scientific discipline plays a part in this fabulously complicated design process. This is a key area of our company and the backbone of the technology development.



PROCESS DEVELOPMENT

Our process engineers have proven expertise in bringing products from design to high volume manufacturing. It is a delicate balance to engineer a process that takes into account the complexities of materials interaction and broad thermal tolerance to allow for shipping and product use all while using the most cost-effective solution possible and maintaining the highest possible product quality.

EQUIPMENT DEVELOPMENT

It is to be expected that when you are designing a leading technology product that some non-standard pieces of manufacturing equipment are required to build your product. Bespoke equipment is designed by Memjet engineers and is required through all stages of product development, whether it is custom electronic systems to allow wafer, die or printhead level electrical test and validation or novel printing platforms to allow prototype die or printhead imaging tests.

PRINTHEAD MODULE DEVELOPMENT

The printhead module is the heart of print quality. Integrated systems like maintenance and ink management are key components supporting the printhead module as well as managing the life of the printhead and assuring image quality.

Our print systems contain software at every level or layer within our print pipeline. Along with the control required for the previously mentioned functions, we have embedded systems within our print module that make 1,064,000,000 calculations per color every second for an A4 wide image.

Once print is selected, the Memjet software takes care of the information on its way to the printhead. We manage from the point of RIP integration, down to job scheduling, data buffering, system synchronization, pump drives, valve control, solenoids, motors, every aspect of the conversion from image pixels to dots on media. This tight integration of all printing subsystems from digital to mechanical is key to maintaining industry leading print resolution and quality, it also involves almost every engineering discipline in the process.

RELIABILITY TESTING

Reliability engineering on our products starts at the conceptual design phase and continues through to high-volume production. We have engineers with environmental testing expertise as well as experience in mechanics, kinematics, thermodynamics, materials science, and structural analysis. Using the latest computer-aided engineering tools we can design and develop complex products from concept to high-volume manufacturing in a timely and cost-effective manner.

WRITING SYSTEMS AND SYSTEM ENGINEERING

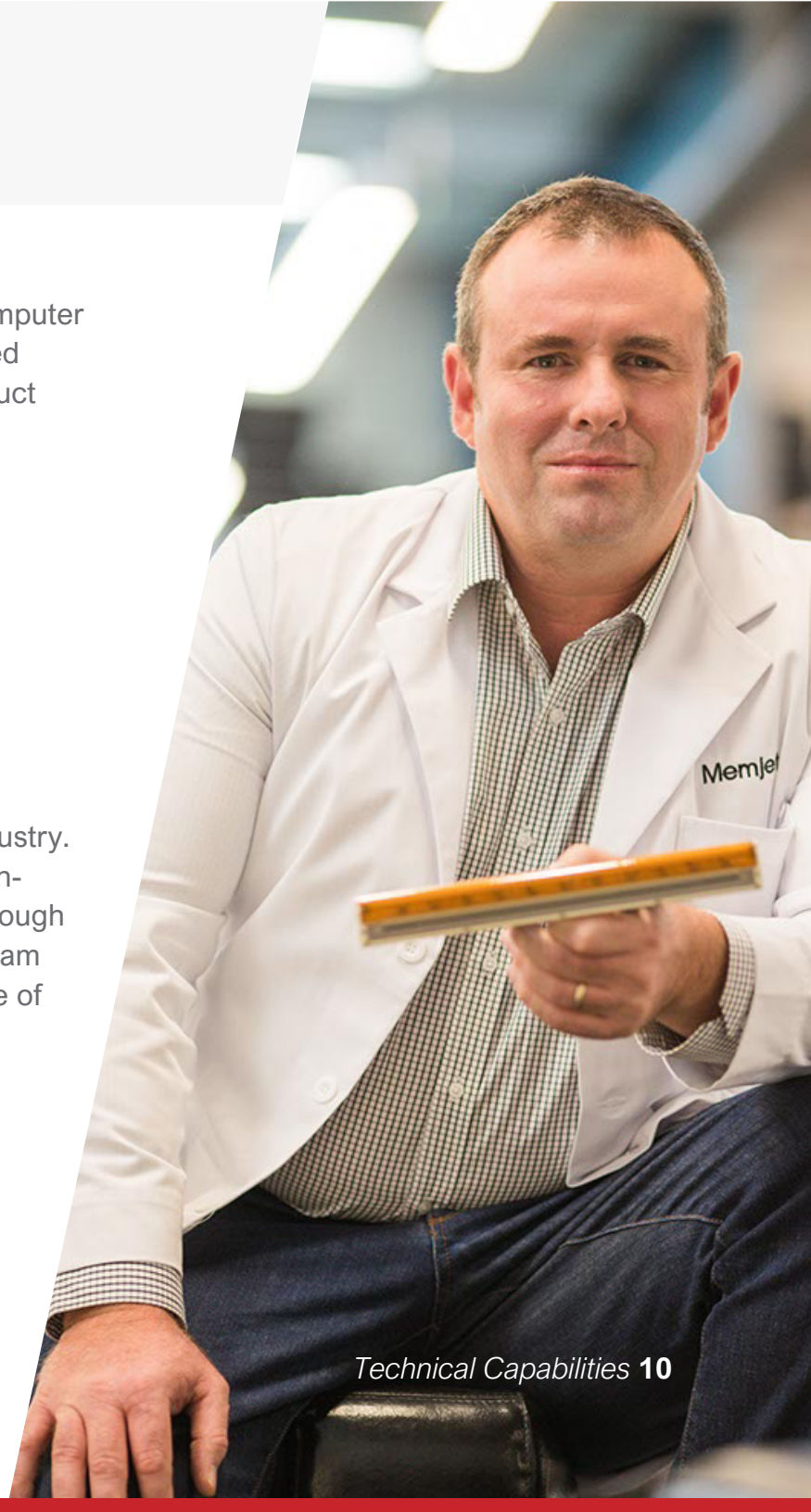
Writing systems and system engineering is performed by our scientists and engineers with extensive experience in image processing, color science, computer graphics and image compression technologies. Our work ranges from applied research through to product development. We create highly innovative product architectures, develop design concepts, develop new algorithms, model and prototype systems, undertake performance analysis and tests and verify complete systems.

APPLICATION ENGINEERING AND SUSTAINING ENGINEERING

Memjet's application support and sustaining engineering is unique in the industry. Our application engineers provide OEMs with documentation, training and on-going support from the initial design of the OEM print solution all the way through production. Once an OEM launches a product, our sustaining engineering team manages the technical tasks to ensure continued operation and maintenance of OEM print systems.

At Memjet, we pride ourselves on developing high-quality and innovative technology that reduces costs and increases profits.

We have all the technical capabilities in house to design complete printing platforms (printheads, ink, modules, and software). This and the overall technical and marketing services support we provide is what positions Memjet uniquely for OEMs in the market.



POWER TO THE OEM

By choosing Memjet technology to power printers, OEMs make a strong statement about the core value of their brand and their solution.

Our team is constantly researching how to make the printhead, modules and ink better for today and for the future. We are always asking how we can make the end user succeed and investigating how our technology can provide the solution.

In the future, it will not just be about printing on paper; it will be about using technology to brand or mark a variety of materials. That's why we research applications and designs that challenge the idea of what printing technology can do.

Memjet's focus on learning is what drives our innovation. We are always listening to our OEMs' feedback, because that makes us better and allows us to improve our products and services.

WE ARE R&D

See the difference Memjet makes for your printer, your business, and your customers' success. Contact us for more information: **Memjet.Info@memjet.com**

JASON THELANDER
VP OF DESIGN

REZA MOGHADDASIAN
VP OF ENGINEERING

JULIE HOGAN
VP OF RESEARCH & DEVELOPMENT

memjet®