



EV GROUP®

Product Range



About EVG

EV Group (EVG) is a leading supplier of high-volume production equipment and process solutions for the manufacture of semiconductors, MEMS, compound semiconductors, power devices and nanotechnology devices.

A recognized market and technology leader in wafer-level bonding and lithography for advanced packaging and nanotechnology, EVG's key products include wafer bonding, thin-wafer processing and lithography/nanoimprint lithography (NIL) equipment, photoresist coaters, as well as cleaning and inspection/metrology systems.

With state-of-the-art application labs and cleanrooms at its headquarters in Austria, as well as in North America and Asia, EVG is focused on delivering superior process expertise to its global R&D and production customer and partner base – from the initial development through to the final integration at the customer's site.

Founded in 1980, EVG services and supports an elaborate network of global customers and partners all over the world, with more than 1300 employees worldwide and fully owned subsidiaries in the U.S., Japan, South Korea, China and Taiwan.

Vision/Mission

invent – innovate – implement

Our Triple-i philosophy is reflected in the enthusiasm for technology, innovative strength and internationality of the entire company. Our vision of "being the first in exploring new techniques and serving next-generation applications of micro- and nanofabrication technologies" enables our customers to successfully commercialize their new product ideas.

invent

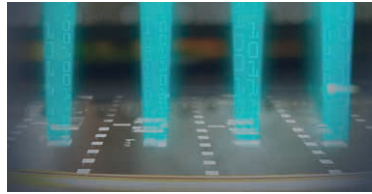
innovate

implement



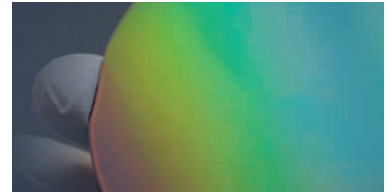
Core Technologies

True to our Triple-i philosophy of "Invent", "Innovate" and "Implement", our core lithography, wafer bonding and metrology technologies enable manufacturers to develop the latest micro- and nanotechnology device breakthroughs, and then bring them into high-volume production, cost effectively and at high process yields.



MLE™ Maskless Exposure Technology

Moving beyond traditional mask-based lithography toward digital lithography technology



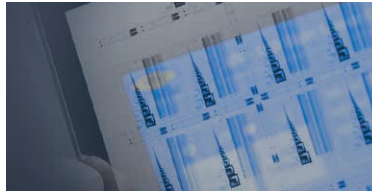
Nanoimprint Lithography (NIL) - SmartNIL®

A large-area soft UV-nanoimprint lithography process for high-volume manufacturing



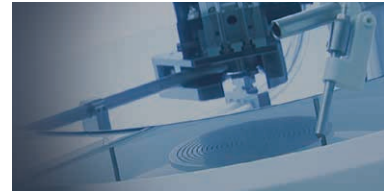
Wafer-Level Optics (WLO)

Market-leading WLO manufacturing portfolio, including step-and-repeat mastering, lens molding, nanoimprint lithography and stacking



Optical Lithography

Most complete technology portfolio, supporting a maximum range of requirements in optical lithography



Resist Processing

Resist processing technology together with patterning are the most repeated steps in semiconductor manufacturing



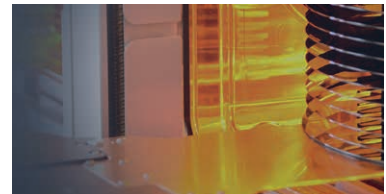
Temporary Bonding & Debonding

Temporary bonding and debonding enabling backside processing for 3D integration



Eutectic Bonding

Eutectic wafer bonding for reliable hermetic sealing



Transient Liquid Phase (TLP) Bonding

Low-temperature metal wafer bonding by Transient Liquid Phase



Anodic Bonding

Anodic bonding for interlayer-free Si-glass bonding



Metal Diffusion Bonding

Metal diffusion bonding for precise interfaces and alignment



Fusion and Hybrid Bonding

For engineered substrates and 3D device integration



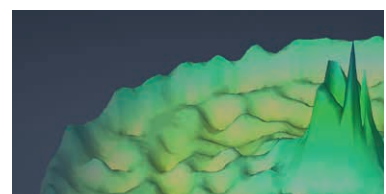
Die-to-Wafer Fusion and Hybrid Bonding

Collective and direct-placement die-to-wafer bonding



ComBond®

High vacuum wafer bonding technology



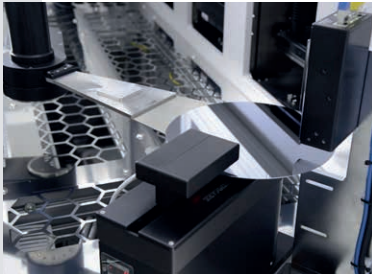
Metrology

Process control and optimization for lithography and bonding



Wafer Bonding

With extensive experience in designing and manufacturing precision wafer bonding equipment, EVG is well recognized for setting industry standards in wafer bonding. EVG wafer bonding systems can be configured for R&D, pilot-line or high-volume production, and for any direct or interlayer-based bonding process, including sophisticated low-temperature covalent bonding. With this portfolio of technologies and equipment, EVG addresses markets for advanced packaging and 3D integration, MEMS, as well as advanced compound semiconductor and SOI substrates, holding the leading position and dominant market share.



Permanent Bonding Systems

The introduction of EVG's wafer-bonding approach, which separates the bond alignment from the bonding step, immediately revolutionized the market. Utilizing high-contact forces under elevated temperatures and a controlled atmosphere, this approach is today's process standard, with EVG holding the dominant market share for both semi- and fully automated wafer bonders and an installed base of more than 1500 chambers. EVG's wafer bonders offer optimal total cost of ownership and bonding yield. Industry-leading alignment accuracies of less than 100 nm and a high-volume-proven modular platform enable the combination of EVG's wafer bonding technologies for MEMS, 3D integration and advanced packaging applications.



Temporary Bonding and Debonding Systems

Temporary bonding is an essential process to offer mechanical support for thin or to-be-thinned wafers, important for 3D ICs, power devices and FoWLP wafers, as well as for handling fragile substrates like compound semiconductors. A device wafer is bonded to a carrier wafer with the help of an intermediate temporary bonding adhesive, allowing the typically fragile device wafer to be processed with additional mechanical support. After the critical processes, the wafer stack is debonded. EVG's outstanding bonding know-how is reflected in its temporary bonding equipment, which has been provided by the company since 2001.



Bond Alignment Systems

With the invention of the world's first double-sided alignment system in 1985, EV Group revolutionized MEMS technology and set worldwide industry standards in aligned wafer bonding by separating the alignment and bonding process. This separation results in higher flexibility and universal application of the wafer bonding equipment. EVG's bond alignment systems offer the highest precision, flexibility and ease of use, and modular upgrade capability, and have been qualified in numerous high-throughput production environments. The precision of EVG bond aligners accommodates the most demanding alignment processes.



Fusion and Hybrid Bonding Systems

Fusion or direct wafer bonding enables permanent connection via dielectric layers on each wafer surface used for engineered substrates or layer transfer applications such as backside illuminated CMOS image sensors. Hybrid bonding extends fusion bonding with embedded metal pads in the bond interface, allowing face-to-face connection of wafers. The main application for wafer-to-wafer (W2W) and die-to-wafer fusion and hybrid bonding is advanced 3D device stacking and heterogeneous integration.



Metrology

Metrology is essential to control, optimize and ensure the highest yield in semiconductor manufacturing processes. By implementing feedback loops, both process control and process parameter correction are enabled, which allow compliance to tighter process requirements.

EVG's metrology solutions are optimized for lithography and all types of bonding applications, and use non-destructive measurement methods. Customers can choose between integration of the metrology technology within fully automated process equipment, or stand-alone metrology systems serving multiple process steps.

Lithography

EVG's key competencies in lithographic technology lie in the high-throughput contact and proximity exposure capabilities of its mask aligners and its newly developed, revolutionary and highly versatile LITHOSCALE® maskless exposure lithography systems. These capabilities are complemented by its resist coating and resist development systems with advanced in-house process competences and hands-on development skills. Most of EVG's lithography equipment platforms are 300-mm ready, can be fully integrated into EVG's HERCULES® lithography track systems, and are complemented by its metrology tools for top-to-bottom-side alignment verification.

EVG constantly looks ahead to future market trends and thus provides application-specific solutions, particularly in advanced packaging, MEMS, compound semiconductors, photonics and biomedical markets where EVG's process and materials expertise - derived from extensive research with a wide range of resist materials - is unsurpassed. Understanding customer needs and providing efficient worldwide support are important ingredients in the success of EVG's lithography solutions.

Mask Alignment Systems

Accommodating wafers and substrates up to 300 mm, varying in size, shape and thickness, EVG's mask alignment systems aim to provide sophisticated solutions with a high grade of automation for advanced applications and full flexibility for research and development.

Maskless Exposure Lithography Systems

Maskless exposure lithography systems represent an entirely new platform of EVG lithography equipment. The world's first highly scalable maskless lithography technology for high-volume manufacturing, MLE delivers unsurpassed flexibility to enable extremely short development cycles for new devices.

Resist Processing Systems

The EVG100 series resist processing systems establish new standards in quality and flexibility for photoresist coating and developing.

Integrated Lithography Track Systems

Lithography track systems complete the EVG lithography product family with a fully integrated production system and high grade of automation combining mask alignment and exposure with integrated pre- and post-processing.

Nanoimprint Lithography (NIL)

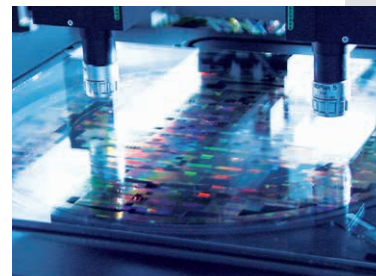
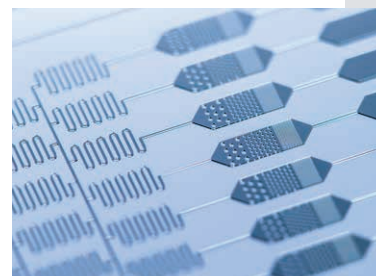
EVG is the market-leading supplier of nanoimprint lithography (NIL) equipment and integration processes. EVG pioneered and mastered NIL from a research approach more than 15 years ago, to implementation in volume production on various substrate sizes from 2 inch compound semiconductor wafers to 300 mm wafers and even on large-area panels. NIL is the most promising and cost-effective process for generating nanometer-scale-resolution patterns for a variety of commercial applications in bioMEMS, microfluidics, electronics and, most recently, various diffractive optical elements.

UV-NIL / SmartNIL® Systems

EV Group provides a complete product line for UV-based nanoimprint lithography (UV-NIL), including different single-step imprinting systems, large-area imprinters as well as step-and-repeat systems for efficient master fabrication.

Hot Embossing Systems

EV Group's series of high-precision hot embossing systems are based on the company's market-leading wafer bonding technology. Hot embossing is a cost-effective and flexible fabrication technology with very high replication accuracy.



LITHOGRAPHY

Mask Alignment Systems



EVG*610
Mask Alignment System
up to 200 mm



EVG*620 NT Mask Alignment System
(semi-automated / automated)
up to 150 mm



EVG*6200 NT Mask Alignment System
(semi-automated / automated)
up to 200 mm



IQ Aligner* NT Automated
Mask Alignment System
up to 300 mm

MLE™ Systems



LITHOSCALE® Maskless Exposure
Lithography System
up to 300 mm

Resist Processing Systems



EVG*101 Advanced
Resist Processing System
up to 300 mm



EVG*105
Bake Module
up to 300 mm



EVG*120 Automated
Resist Processing System
up to 200 mm



EVG*150 Automated
Resist Processing System
up to 300 mm

Lithography Track Systems



HERCULES®
Lithography Track System
up to 300 mm

UV Nanoimprint Lithography / SmartNIL® Systems



EVG*610
UV-NIL System
up to 150 mm



EVG*620 NT
SmartNIL® UV-NIL System
up to 150 mm



EVG*6200 NT
SmartNIL® UV-NIL System
up to 200 mm



EVG*720 / EVG*7200 Automated
SmartNIL® UV-NIL System
up to 200 mm



EVG*7300 Automated
SmartNIL® UV-NIL System
up to 300 mm



EVG*7200 LA Large-Area
SmartNIL® UV-NIL System
up to 550 mm x 650 mm (Gen 3)

UV Nanoimprint Lithography / SmartNIL® Systems



HERCULES® NIL Fully Integrated
SmartNIL® UV-NIL System
up to 200 mm



HERCULES® NIL Fully Modular and
Integrated SmartNIL® UV-NIL System
up to 300 mm



EVG*770 NT Step-and-Repeat
NIL System
up to 370 mm x 470 mm (Gen 2)

Permanent Bonding Systems



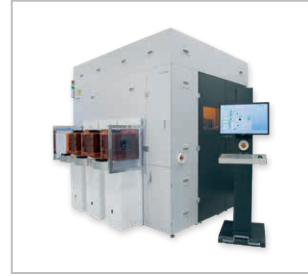
EVG*501 / EVG*510
Wafer Bonding System
up to 200 mm



EVG*520 IS
Wafer Bonding System
up to 200 mm



EVG*540 Automated
Wafer Bonding System
up to 300 mm



EVG*560 Automated
Wafer Bonding System
up to 300 mm



ComBond* Automated High-Vacuum
Wafer Bonding System
up to 200 mm



GEMINI* Automated Production
Wafer Bonding System
up to 300 mm

Temporary Bonding and Debonding Systems



EVG*805
Debonding System
up to 300 mm



EVG*850 TB / DB Automated
Temporary Bonding / Debonding
System up to 300 mm



EVG* Layer Release System
for 300 mm



EVG*610 BA
Bond Alignment System
up to 200 mm



EVG*620 BA / EVG*6200∞ BA
Automated Bond Alignment System
up to 200 mm



SmartView* NT Automated Bond
Alignment System for Universal
Alignment up to 300 mm

Fusion and Hybrid Bonding Systems



EVG*301
Single Wafer Cleaning System
up to 300 mm



EVG*320 Automated
Single Wafer Cleaning System
up to 300 mm



EVG*810 LT LowTemp™ Plasma
Activation System
up to 300 mm



EVG*850 LT Automated Production
Bonding System for SOI and Direct
Wafer Bonding up to 300 mm



EVG*850 Automated
Production Bonding System for SOI
up to 300 mm



GEMINI* FB Automated
Production Wafer Bonding System
up to 300 mm

Fusion Bonding Systems



BONDSCALE* Automated
Production Fusion Bonding System
up to 300 mm



EVG*320 D2W Automated
Die Preparation and Activation System
up to 300 mm



GEMINI* FB D2W Automated
Collective Die-to-Wafer Bonding
System up to 300 mm



EVG*20
IR Inspection Station
up to 300 mm

Metrology Systems



EVG*40 NT / EVG*40 NT2
Automated Measurement System
up to 300 mm



EVG*50
Automated Metrology System
up to 300 mm



BONDING

Process Development Services

EV Group's comprehensive process knowledge is a result of our decades of experience. This knowledge creates benefits and advantages for our customers from the early stages of process development to the final goal of high-volume production. With state-of-the-art application labs and cleanrooms at our headquarters in Austria, along with North America and Asia, EV Group is focused on delivering superior process expertise to our growing global customer base every step of the way. We can provide support for initial development through final integration at the customer's site. Process know-how is key to achieving the shortest time to market for your product.

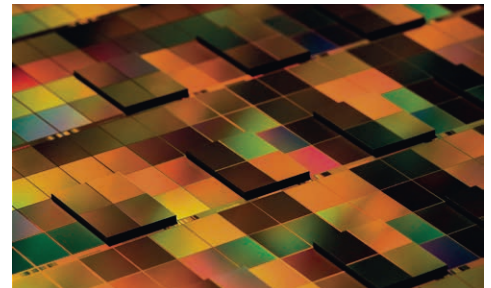
EVG® NILPhotonics® Competence Center Development and Manufacturing of Innovative Photonic Device Solutions

EVG's NILPhotonics Competence Center is a flexible cooperation model that leverages EVG's equipment and process knowhow gained through many years of experience to support the diversified needs of the photonics market.



EVG® Heterogeneous Integration Competence Center™ Innovation Incubator for Heterogeneous Device Integration

EVG's Heterogeneous Integration Competence Center is designed to assist customers in leveraging EVG's process solutions and expertise to enable new and enhanced products and applications driven by advances in system integration and packaging.



Process Technology

EVG is focused on delivering superior process expertise to our global R&D and production customer and partner base. Our process development teams work hand-in-hand with customers, from the initial process development through to the final integration at their production sites. Services range from equipment demonstrations and feasibility studies to small-to-medium-scale pilot-line production to shorten time to market.

Last but not least, EVG's process technology business unit performs independent research work to explore and develop baseline processes that will open up new market opportunities for us and our customers.

This includes working with partners such as materials suppliers to develop and optimize new processes and capabilities.



Customer Support

Customer satisfaction is critically important for EVG. Our worldwide customer support centers and spare parts supply network deliver on our commitment to provide on-demand, quality service that our local customers and partners have come to expect from EVG. With outstanding experience and knowledge, our team is ready to provide you with immediate assistance through remote diagnostics and on-site service with extremely short response times around the globe.



EVG Academy

The EVG Academy, located at EVG's headquarters in Austria provides technical training on all classes of EVG equipment as well as on EVG's CIM Framework software platform in an optimized, purpose-built, 800-square-meter environment. The world-class facility sets new standards for knowledge transfer in our industry and includes eight individual training areas – one for each major class of EVG equipment – as well as four classrooms and a dedicated workshop area for electrical and mechanical training.

Thanks to the extensive floorspace, the EVG Academy offers a great number and type of tools available for training, including EVG's fully automated HVM platforms, such as the GEMINI FB automated production wafer bonding system with SmartView NT3 bond aligner and the BONDSSCALE automated production fusion bonding system.

By attending in-depth, tiered training classes at the EVG Academy in a greatly enhanced learning experience, customers can be qualified to perform basic repairs as well as preventative maintenance on EVG equipment without the need to contact EVG customer support—providing customers with greater flexibility for tool maintenance.





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