

Lithography & bonding: More than Moore devices are boosting the equipment industry¹

All equipment markets are growing to reach US\$2.4 billion in 2026, driven by lithography and bonding processes.

OUTLINE:

- **Market forecasts:**
Lithography equipment for MtM² market is a fast-growing market with a CAGR³₂₀₂₀₋₂₀₂₆ forecast at 9%, resulting in projected US\$1.7 billion sales in 2026.
Lithography equipment for CIS⁴ is the largest market segment in 2026, reaching US\$550 million, followed by lithography equipment for power devices reaching US\$404 million.
Power devices and CIS applications are both at 7% CAGR₂₀₋₂₆.
- **Technology trends:**
A general trend towards adoption of projection lithography (steppers and scanners) as replacements for mask aligners.
Hybrid bonding will continue to grow for AP⁵ applications and will diversify into W2W⁶ and D2W⁷.
Temporary bonding is led by AP applications.
- **Supply chain:**
The USA-China Trade War, the tendency to build up- local supply chain, and the influence of the COVID-19 pandemic strongly impacted the lithography & bonding equipment market.
ASML, Nikon and Canon are the lithography tool vendor giants that serve the mainstream and MtM markets.

*“Without a doubt, 2020 was a difficult year for device manufacturers.” asserts **Taguhi Yeghoyan, PhD., Technology & Market Analyst, Semiconductor Manufacturing at***

¹ Extracted from: [Lithography and Bonding equipment for More than Moore 2021](#) report, Yole Développement, 2021

² MtM: More than Moore

³ CAGR: Compound Annual Growth Rate

⁴ CIS: CMOS Image Sensor

⁵ AP: Advanced Packaging

⁶ W2W: Wafer-to-Wafer

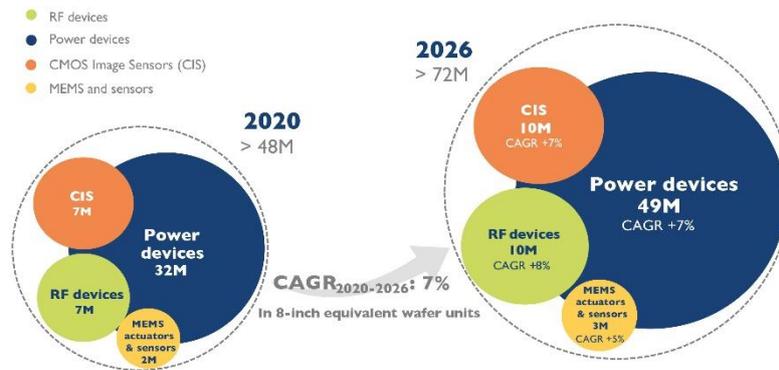
⁷ D2W: Die-to-Wafer (permanent bonding)

Yole Développement (Yole). She adds: “Chip demand soared mainly in the consumer market due to lockdowns and working from home. Despite the cash injection, manufacturers could not keep up with increased demand. Massive fab expansions and equipment orders followed.”

Production was held up worldwide due to the COVID-19 pandemic, lockdowns and climate and accident-related issues. All these aspects generated chip shortages across all markets. Governments and the public realized the semiconductor industry’s importance in everyday life and national sovereignty. As such, private and public manufacturing giants rushed to increase production volume, announcing fab expansion or new locations, while governments increased industry incentives worldwide.

Lithography & bonding equipment market: 2020 – 2026 wafer start volume split by applications

(Source: Lithography and Bonding Equipment for More than Moore 2021 report, Yole Développement, 2021)



In this context, Yole investigates disruptive patterning and bonding technologies and related markets in depth, to point out the latest innovations and underline the business opportunities.

Released today, the Lithography and Bonding equipment for More than Moore 2021 report provides an overview of photolithography and permanent as well as temporary bonding equipment for MtM device manufacturing and associated state-of-the-art and emerging processes. It also proposes an in-depth understanding of the lithography and bonding ecosystem. Including market trends and forecasts, supply chain, technology trends, technical insights and analysis, take away and outlook, this study also delivers an in-depth understanding of the ecosystem and main players’ strategies.

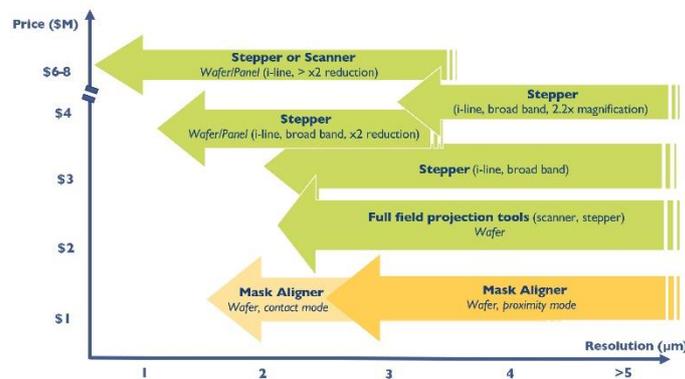
What are the economic and technological challenges of the lithography and bonding industry? What are the key drivers? Who are the equipment manufacturers to watch, and what innovative technologies are they working on?

Yole presents today its vision of the lithography and bonding equipment industry for MtM devices.

As analyzed by Yole’s team in the new Lithography and Bonding equipment for More than Moore 2021 report, manufacturers’ cash injection resulted in soaring fab equipment orders. Thus, 2020 was the best year ever for many HVM⁸ equipment providers. But they had difficulties to keep up with equipment production either. Assembly and delivery time increased from several months to a year. As such, equipment orders have spilled over into 2021 and 2022. This should sustain equipment vendors’ revenue in following years.

2020 Price/cost gap in patterning tools: mask aligner & projection exposure

(Source: Lithography and Bonding Equipment for More than Moore 2021 report, Yole Développement, 2021)



The lithography and bonding equipment market dedicated to MtM device manufacturing totaled US\$1.38 billion in 2020. It is highly fragmented. Some players specialize in tools for given applications, like fan-out panel level packaging or steppers dedicated to small compound semiconductor wafers. Other players, make their tools more flexible, such as in maskless lithography or hybrid bonding tools dedicated to W2W and D2W processes. According to **Taguhi Yeghoyan**: “Photolithography tool sales for MtM were US\$1 billion in 2020. They are driven by CIS applications at 30% of the market, followed by AP, power, RF⁹ and MEMS. Projection lithography tools account for 87% of the market, while traditional mask aligners still account for 12% of the market”.

Currently, Canon is the MtM photolithography instrument sales leader with 34% market share, offering a wide variety of tools. However, ASML is closing in on Canon, with 21% share, and looks attentively at MtM manufacturing trends. AP photolithography tool sales are driven by SMEE, present in the domestic Chinese market. Finally, SÜSS MicroTec remains the leader of mask aligner sales. The permanent bonding market was worth US\$259 million in 2020 with EVG being an undisputable leader, owning 75% of the market and selling mostly hybrid, fusion as well as SAB¹⁰ tools. The temporary bonding equipment market was worth \$106M in 2020

⁸ HVM: High Volume Manufacturing

⁹ RF: Radio Frequency

¹⁰ SAB: Surface Activated Bonding

and is driven by AP. This market is fragmented between EVG, TAZMO, SÜSS MicroTec and TEL.

After a very good 2020 year for HVM equipment vendors, a positive outlook is likely in coming years. The MtM lithography, permanent and temporary bonding equipment markets are expected to grow further. Their CAGR from 2020 to 2025 are 9%, 13% and 7% respectively. Together, these markets can be worth US\$2.4 billion in 2026.

All year long, *Yole Développement* publishes numerous reports and monitors. In addition, experts realize various key presentations and organize key conferences.



In this regard, do not miss the Commercialization of Micro/Nano & Emerging Technologies (COMET) Conference, from Sunday 22, August to Wednesday 25, August 2021, online. **Taguhi Yeghoyan, PhD, Market and Technology Analyst, Semiconductor manufacturing Division at Yole** will present “Lithography and

Bonding Equipment in growing MEMS and Sensors Market for Consumer and Automotive Applications”. Register now on [i-Micronews](https://www.i-micronews.com).

In addition, take part in the Connecting Heterogeneous Systems Summit, and participate to **Taguhi Yeghoyan’s** presentation: “MEMS and CIS: Lithography and Bonding Equipment Market State and Outlook”, on September 1st, 2021. Register [here](#).

Make sure to be aware of the latest news coming from the industry and get an overview of our activities, including interviews with leading companies and more on [i-Micronews](https://www.i-micronews.com). Stay tuned!

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About our analyst

Taguhi Yeghoyan PhD., is a Technology & Market Analyst, Semiconductor Manufacturing at Yole Développement (Yole), within the Semiconductor, Memory & Computing division. Taguhi's mission is to follow daily the semiconductor industry and its evolution. Based on her expertise in this field, especially on the semiconductor value chain (processes, materials, equipment, and related applications), Taguhi performs technology & market reports and is engaged in dedicated custom projects. Prior to Yole, she worked in world-class European research centers and laboratories, including imec (Belgium), LMI (Lyon, France) and LTM at CEA Leti (Grenoble, France). All along her past experiences, Taguhi has authored or co-authored one patent and more than nine papers. She has graduated from Wroclaw University of Technology (Poland) and University of Lyon (France). Taguhi also completed her PhD. in Material Science from the University of Lyon (France).

About the report

Lithography and Bonding equipment for More than Moore 2021

All More than Moore device production equipment markets are growing, driven by lithography and bonding, reaching \$2.4B in 2026. – Performed by Yole Développement

Companies cited:

3M, Alpha Tools, Applied Microengineering (AML), Advanced System Technology (ast), Adtec Engineering, Amkor, ASE Group, ASML, ASM Pacific Technologies, Advanced System Technology (ast), Ayumi Industry, Applied Materials, Broadcom/Avago, BondTech, Brewer Science, Canon, Cello Technology, Circuit Fabology Microelectronics Equipment (CFMEE), Deca, Delphi Laser, Dynatech, EO Technics, ERS electronic, Eshylon Scientific, EV Group, Hakuto, Heidelberg Instruments, Intel, Kingyup Optronics, KLA Tencor/Orbotech, Kulicke & Soffa (Liteq), Japan Science Engineering, Micron, Mitsubishi Heavy Industries, and more...

Related reports:

- [6" and Below: Small-Dimension Wafer Market Trends 2020](#)
- [Thinning Equipment Technology and Market Trends for Semiconductor Devices](#)
- [High-end Performance Packaging: 3D/2.5D Integration 2020](#)
- [Fan-Out WLP and PLP Applications and Technologies 2021](#)
- [Wafer to Wafer Permanent Bonding Comparison 2018](#)

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Founded in 1998, Yole Développement (Yole) has grown to become a group of companies providing marketing, technology and strategy consulting, media and corporate finance services, reverse engineering and reverse costing services and well as IP and patent analysis. With a strong focus on emerging applications using silicon and/or micro manufacturing, the Yole group of companies has expanded to include more than 80 collaborators worldwide... [More](#)

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