

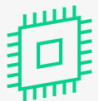
Excellent Laser Technologies for the Sustainable Prosperity of Europe



Sustainable Manufacturing with Advanced Laser Processing

Innovations for **greener**, more **efficient production lines**, supporting Europe's transition to sustainable industrial manufacturing:

- **Surface Functionalization & Texturing:** precision laser structuring techniques for advanced material properties;
- **Minimizing Material Waste & Enabling Circular Economy:** high-efficiency laser processing reducing raw material usage;
- **Multi-Beam and High-Speed Laser Processing:** enhancing laser capabilities to increase throughput and productivity;
- **Real-Time Process Monitoring & Optimization:** AI-driven laser diagnostics for real-time adjustments.



Next-Generation Laser Technologies for the Semiconductor Industry

Future-proofing Europe's semiconductor industry, ensuring a strong, resilient, and technologically **strong supply chain**:

- **Deep-Ultraviolet (DUV) Laser Technology:** high-energy DUV lasers for advanced chip manufacturing and inspection;
- **Through-Silicon Vias (TSV) and Selective Laser Processing:** laser drilling and metal deposition techniques to enhance chip interconnectivity;
- **Heterogeneous Integration & Packaging:** laser-based selective metal plating for next-generation electronic devices;
- **Laser-Assisted Semiconductor Manufacturing:** precision laser machining improving yield rates, reducing defects, and increasing energy efficiency.



Laser Applications in Biomedicine and Biotechnology

Development of safer, more effective medical treatments, transforming healthcare and biotechnology with laser-enabled solutions:

- **Microfluidic and Lab-on-a-Chip Devices:** laser micromachining creating high-precision biochips;
- **Antibacterial & Biocompatible Surfaces:** development of laser-textured implants and medical tools that reduce bacterial adhesion;
- **Laser-Assisted Cell & Tissue Engineering:** high-precision laser techniques for controlled cell growth, wound healing, and regenerative medicine;
- **Precision Laser Surgery & Therapeutic Applications:** exploration of minimally invasive laser-based treatments.



Digital & 3D Printing in Laser System Development

Smarter, more adaptable, and highly efficient laser systems for seamless adoption across high-tech industries:

- **3D-Printed Laser Components:** advanced additive manufacturing to create lighter, stronger, and thermally optimized laser systems;
- **AI & Digital Simulation for Laser Optimization:** machine learning and real-time simulations for enhanced precision, stability, and energy efficiency;
- **Topology Optimization for Lightweight Laser Designs:** innovative structural designs reducing system weight;
- **Hybrid Manufacturing for Next-Gen Lasers:** subtractive and additive laser processing for more efficient, flexible laser production.



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