

FROM THE LAB TO THE FAB

# MEMS & MICROSYSTEMS TECHNOLOGY

We strive to bring your MEMS and microsystems innovations to life in our industry-grade environment.

Your partner for MEMS & Microsystems development from the lab to the fab



We embody more than 30 years of expertise in a diverse range of demanding fields, such as watchmaking, space, life sciences, and harsh environments. Our seasoned and permanent team supports our partners with a flexible mindset empowered with a state-of-the-art 150 mm wafer cleanroom.

At CSEM, our expertise covers the full development cycle, from MEMS design to process development and production. Whether you need a complete development, some design inputs, or just a few thin-film depositions, we are here for you.

## Concept & specifications assessment



The concept phase is the first step towards the realization of a new MEMS. This phase is about you, your needs, and your expectations. It is also a good occasion to get acquainted and learn how to work together. We review your specifications, discuss their impact on the full development, and give design inputs.

## Feasibility study



Our team is fully versed in MEMS design and Multiphysics simulation. We put your MEMS concept through its paces; we test, simulate, and confirm the key specifications. In parallel, we identify the main risks that could occur during the fabrication and test them in short fabrication loops. The specifications, design, and development plan are fine-tuned based on our findings.

## Process development & prototyping

Each key process step is developed and optimized in our 700 m<sup>2</sup> MEMS cleanroom. We set up the process documentation and knowledge following our ISO-9001 quality system. A full run of prototypes is manufactured and delivered for the initial tests and characterization.



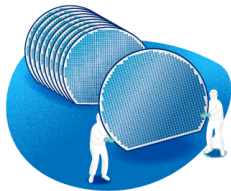
## Characterization & reliability testing



A fully-equipped reliability laboratory, biosafety laboratory, and various application development groups complement our cleanroom capabilities. Fully versed in materials and devices characterization—including the investigation of microstructure, defects, stress, thin-film morphology, mechanics, and hermeticity—we conduct multiple-parameter reliability tests

approved by the European Space Agency.

## Industrialization, packaging & production



We help you mature your technology and qualify it in a production-grade setting, from the lab to the fab. Together, we define the statistical process control and final tests. The manufacturing process is then stabilized, and its yield is improved. We take care of low to mid-volume manufacturing, up to 2-3 lots per month. Should bigger volumes be necessary, we support the transfer to mid to high-volume foundries.

You have the vision; we have the tools and expertise to realize it.

We constantly develop and mature new technology bricks, new processes, and new materials to anticipate the needs and trends of the industry. With complementary expertise in surface engineering (<https://www.csem.ch/Nanosurface>), ultra-low-power electronics (<https://www.csem.ch/SystemOnChip>), and data processing (<https://www.csem.ch/Vision>), we support the whole value chain of MEMS and microsystems applications.

## Key MEMS process capabilities

- Sub-micron lithography
- 700  $\mu\text{m}$  vertical DRIE with multi-level capability
- Thermocompensated silicon
- Piezoelectric thin films
- Glass machining
- Wafer-level bonding
- Wide range materials

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## Expertise

- Process development
- FMEA, risk management
- Statistical process control
- Functional & reliability testing
- Characterization
- Biolab safety 2 testing & validation
- ASIC design
- Surface functionalization

# Key application areas

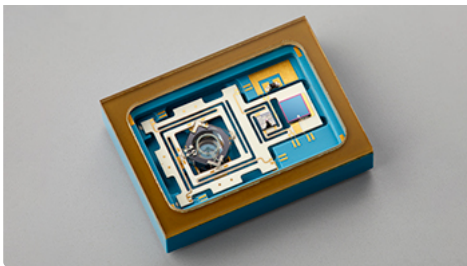
## WATCH & MECHANICAL PARTS



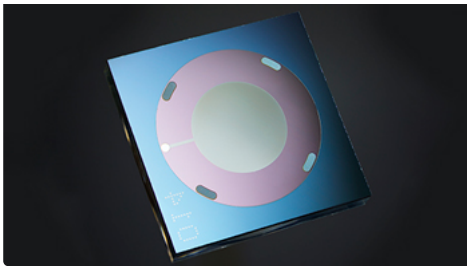
## BIOMEMS & MICROFLUIDICS



## PHOTONICS & OPTICS



## SPECIALTY SENSORS & ACTUATORS



# RELATED INFORMATION

## Pages

[Center of excellence in characterization](#)

Our unique approach to serving you in materials characterization and testing.

## Documents

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