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The MEMS 5-in-1 Test Chips (Reference Materials 8096 and 8097)

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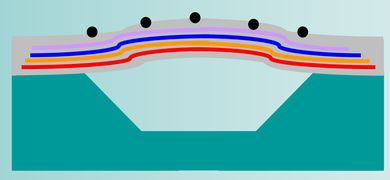
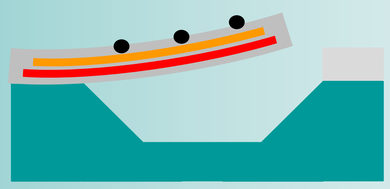
"Through their involvement, NIST plays a crucial role in the development of standards and shapes the future of the MEMS industry in the United States" - Chris Muhlstein, ASTM

Test Structures

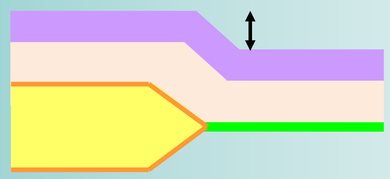
Young's modulus



Residual strain



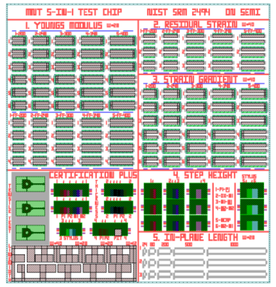
Strain gradient



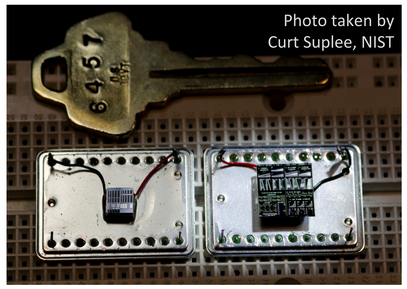
Step height

In-plane length

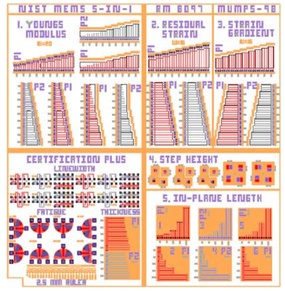
• MEMS 5-in-1 Reference Materials



CMOS RM 8096



(For release in 2013)



RM 8097

• Building Blocks

– NIST Standard Reference Database 166

- MEMS Calculator Web Pages validate industry measurements
- http://srdata.nist.gov/gateway/ with keyword "MEMS Calculator"

– Documentary standards

- SEMI
  - MS4-0212: Young's modulus
  - MS2-0212: Step height
- ASTM (Led Development of First Standards)
  - E 2245-11: Residual strain
  - E 2246-11: Strain gradient
  - E 2244-11: In-plane length

– CMOS compatible MEMS test structures

– Fundamental measurement research

- Test structure design
- Test structure measurement and analysis

Goal

- Develop measurement methods to characterize MEMS devices for reliable manufacturing.

Deliverables

- R&D focused on
  - Test structure measurements
  - Measurement methods
- Scientific publications
- Documentary standards
- Standard Reference Database
- Reference Materials

Customers & Collaborators

- MEMS designers
- Test equipment manufacturers
- IC and MEMS foundries & services
- Industry standards organizations

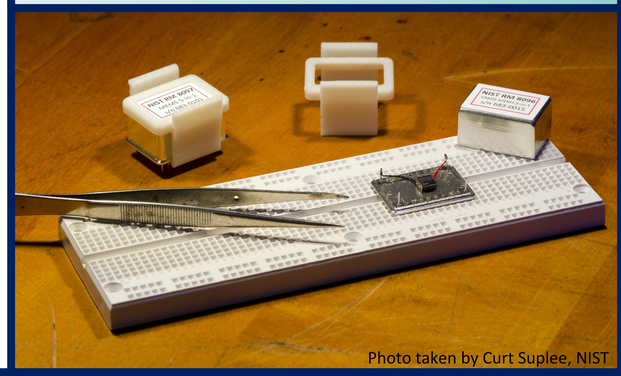


Photo taken by Curt Suplee, NIST