SYSTEM Plus CONSULTING

Reverse Costing & Technology Analysis **TOOL**

MEMS CoSim+

Costing Tool For MEMS Manufacturing

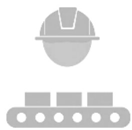
PROCESS-BASED TOOL

COMPLETE AND POWERFUL TOOL DESIGNED FOR THE MEMS COMMUNITY

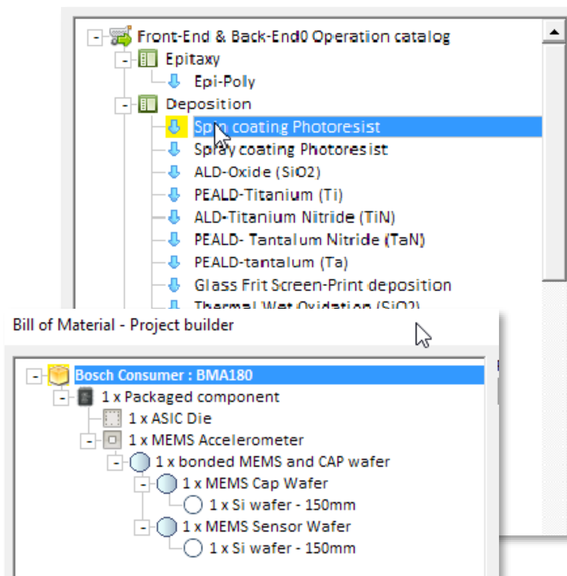
Due to their non-standard manufacturing processes, MEMS device costs can be difficult to estimate. Components such as accelerometers, pressure sensors, inkjet heads or micromirrors involve very different process steps.

MEMS CoSim+ is a flexible tool for evaluating the cost of any MEMS processor component, already used by manufacturers and end users.

With the possibility of storing steps and process flows in libraries, this new version dramatically reduces the duration of the cost evaluation.



Step by step, describe your process flow to get a detailed manufacturing cost analysis.



Why do you need this tool?

- Optimize your manufacturing cost
- Challenge your own production / process choices
- Create a business plan
- Change your fab and process
- Evaluate economic feasibility
- Simulate your equipment's operating cost

Who should buy this tool?

- Marketing executives
- Process managers
- R&D engineers
- MEMS equipment suppliers
- Purchasing managers

MEMS TYPES

Inertial
Environmental
Microphone
BAW filter
Oscillator
Micro-mirror

PACKAGING

Leadframe based
Laminate based
WLP

SUBSTRATES

Silicon
SOI
Glass

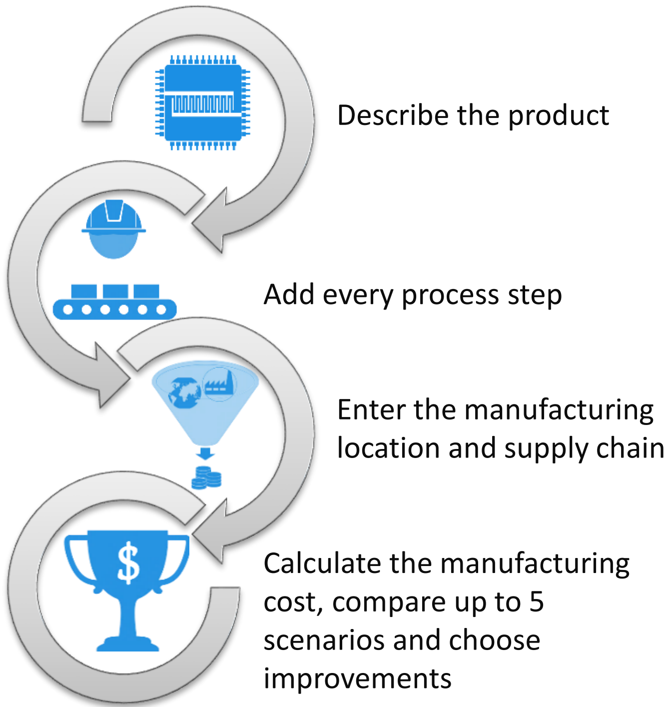
TECHNOLOGIES

Surface micromachining
Bulk micromachining
SOI micromachining
CMOS/MEMS
MEMS over CMOS

DATABASE

Equipment
Substrates
Materials
Wafer fab units
Assembly units

MAIN FEATURES



Describe the product

Add every process step

Enter the manufacturing location and supply chain

Calculate the manufacturing cost, compare up to 5 scenarios and choose improvements

Multiple process flows

Any MEMS process flow can be simulated with hierarchical description for multiple dies or processes, across an unlimited number of process steps or process flows.

Multiple conditions and supply chain

You can set up the tool with your own conditions, including location, clean room class, process type and subcontracting operation parameters.

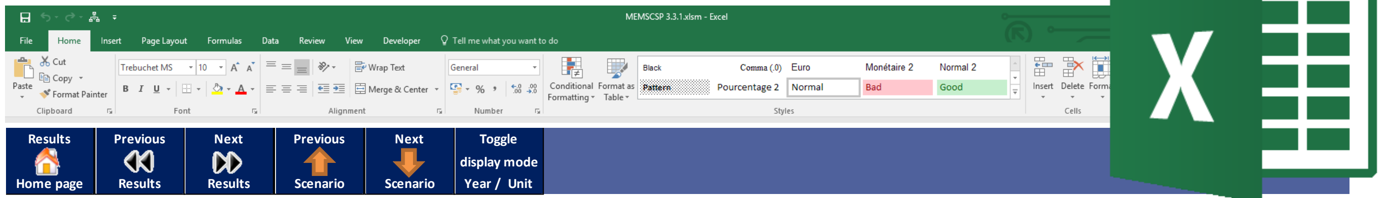
Results are fully open-format

Modify or export final results, build reports with any Excel workbook.

Safely workgroup-compliant

Secure multiple access, data sharing and data integrity.

Support and updates available



Step Family	Process Sequence / Operation	Equipment	Yield	EQUIPMENT COST (USD / Wafer)	CLEAN ROOM COST (USD / Wafer)	LABOR COST (USD / Wafer)	CONSUMABLE COST (USD / Wafer)	TOTAL COST (USD / Wafer)	Active Equipment needs	Actual allocated Equipment	Equipment UpTime
screenshot Bosch Consumer BMF055 : Accelero MEMS Sensor for New MEMS Wafer			95.0%	58.86	20.84	41.40	69.12	190.23	Optimal Mode 41194 Wafer / Year		
	Bosch Consumer Accelero Process		95.00%	58.86	20.84	41.40	69.12	190.23			<=80%
Cleaning/Stripping	Cleaning Multi-Steps	Wafer Cleaning Bench	99.90%	2.89	1.46	3.89	6.31	**14.56**	1.313	1.642	80%
Cleaning/Stripping	Rinsing Multi-steps	Wafer Cleaning Bench	99.90%	0.98	0.50	1.37	0.08	**2.92**	0.445	0.557	80%
Measurement	Measurement Multi-Steps	Measurement	99.90%	1.18	0.95	2.02	0.02	**4.18**	0.639	0.799	80%
Thinning	Wafer Thinning : Backgrinding	Backgrinding	99.90%	0.99	0.28	0.71	2.04	**4.02**	0.188	0.235	80%
Thermal Step	Pad oxide : Thermal Wet Oxidation (SiO2)	Oxidation Furnace vertical	99.90%	2.69	0.28	2.20	0.58	**5.75**	0.745	0.931	80%
Deposition	Buried poly : Deposition of LPCVD-Polysilicon (Poly)	LPCVD	99.90%	0.94	0.55	0.44	0.26	**2.18**	0.106	0.133	80%
Implantation	Buried poly : P-Ions Implantation	Implanter	99.90%	0.78	0.55	0.72	1.06	**3.11**	0.074	0.092	80%
Thermal Step	Buried Poly : Annealing	Annealing Furnace 150-450°	99.90%	0.11	0.02	0.15	0.26	**0.54**	0.031	0.039	80%
Lithography	Buried poly : Lithography 1	Patterning single side (coating + Litho stepper single + development)	99.90%	1.51	0.22	0.51	4.92	**7.17**	0.118	0.148	80%
Etching	Buried poly : Dry Etching Polysilicon	Plasma Reactor	99.90%	0.90	0.45	0.81	0.11	**2.28**	0.136	0.170	80%
Cleaning/Stripping	Buried poly : PR Removal	Plasma Asher	99.90%	0.22	0.12	0.88	0.07	**1.29**	0.159	0.199	80%
Deposition	Sacrificial oxide 1 : Deposition of LPCVD-Oxide (SiO2)	LPCVD	99.90%	0.59	0.35	0.32	0.15	**1.41**	0.067	0.084	80%
Lithography	Sacrificial oxide 1 : Lithography 2	Patterning single side (coating + Litho stepper single + development)	99.90%	1.51	0.22	0.51	4.92	**7.17**	0.118	0.148	80%
Etching	Sacrificial oxide 1 : Dry Etching Oxide-SiO2	Plasma Reactor	99.90%	1.07	0.54	0.89	0.13	**2.63**	0.162	0.202	80%
Cleaning/Stripping	Sacrificial oxide 1 : PR Removal	Plasma Asher	99.90%	0.22	0.12	0.88	0.07	**1.29**	0.159	0.199	80%
Deposition	Seed layer : Deposition of LPCVD-Polysilicon (Poly)	LPCVD	99.90%	0.94	0.55	0.44	0.26	**2.18**	0.106	0.133	80%
Implantation	Seed layer : P-Ions Implantation	Implanter	99.90%	0.78	0.55	0.72	1.06	**3.11**	0.074	0.092	80%
Thermal Step	Seed Layer : Annealing	Annealing Furnace 150-450°	99.90%	0.11	0.02	0.15	0.26	**0.54**	0.031	0.039	80%
Lithography	Seed layer : Lithography 3	Patterning single side (coating + Litho stepper single + development)	99.90%	1.51	0.22	0.51	4.92	**7.17**	0.118	0.148	80%
Etching	Seed layer : Dry Etching Polysilicon	Plasma Reactor	99.90%	0.90	0.45	0.81	0.11	**2.28**	0.136	0.170	80%
Cleaning/Stripping	Seed layer : PR Removal	Plasma Asher	99.90%	0.22	0.12	0.88	0.07	**1.29**	0.159	0.199	80%
Deposition	Sacrificial oxide 2 : Deposition of LPCVD-Oxide (SiO2)	LPCVD	99.90%	1.52	0.90	0.63	0.41	**3.45**	0.172	0.215	80%

CONTACT

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