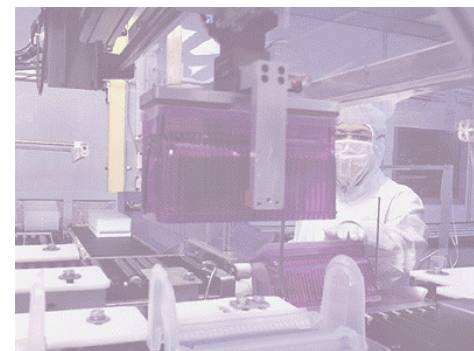
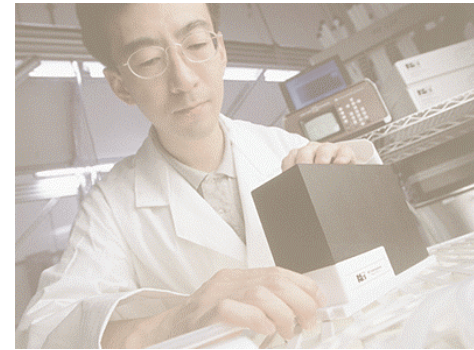




## EUV Carrier Program

Stephen Sumner  
Director, Applied Technologies

*The materials integrity management company*



# Summary

- Entegris has designed and built molded alpha prototypes
  - 200mm SMIF interface
  - Compliant with most 200mm RSP standard specifications
- Entegris met alpha-phase performance goal
  - Bare reticle shipping
  - $\leq 5$  particles @  $\geq 60\text{nm}$

# The Pull

- To develop a carrier that maintains a level of contamination control sufficient for pellicleless EUV reticles

# The Preferences

- To provide a carrier that can be used as both a patterned reticle shipper and process carrier
- To provide a carrier that interfaces with existing standard infrastructure

# The Philosophy

- All work is considered tentative
  - Entegris is aware that SEMI standards, IDM's, and OEM's requirement are likely to change
- Go with what you know
  - Leverage as much current design BoK and infrastructure as possible to minimize economic and performance risk
- Spend resources on known deficient areas
  - Carrier seals and retention

# The Product

- 99% Polymer construction
  - Entegris realizes that polymers most likely will not be suitable for EUV, but the design is not limited by materials
  - Polymers are well understood by Entegris and were used to minimize unknown variables
- 100% compatible with 200mm SMIF interface
  - 200mm chosen over 150mm because of mechanical advantages in opening/closing
  - Most SMIF patterning facilities use the 200mm standard
  - Offers sufficient real estate for protective enclosures

# The Product



# The Performance

- Results are anecdotal, but useful
- 2 rounds of testing completed
- Round 1 results
  - 1-way adders of 12, 13 & 16 particles for bulk packaging
  - 1-way adders of 34 particles for single capacity packaging
- Round 2 results
  - 1-way adders of 0, 3, & 4 particles for bulk packaging
  - No single capacity packaging testing

# The Prognosis

- Entegris has moved the discussion from feasibility to possibility
- Entegris believes that acceptable particle performance reliably can be achieved
- Entegris has identified several areas for further improvement in performance
  - Cleaning
  - Secondary packaging
  - Materials
  - Handling