

Entegris EUV Carrier Update

IEUVI Mask TWG - Oct 6, 2013

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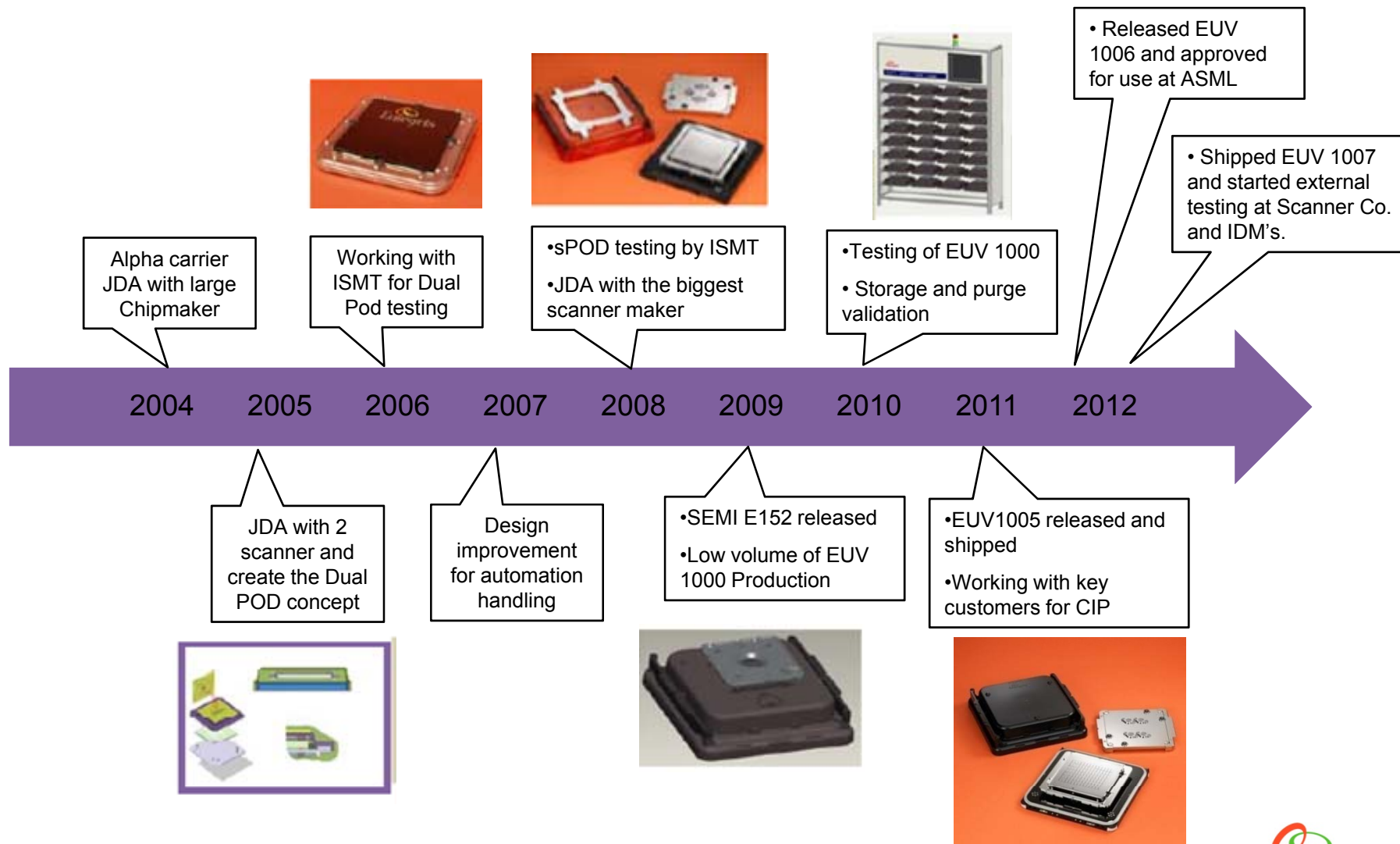




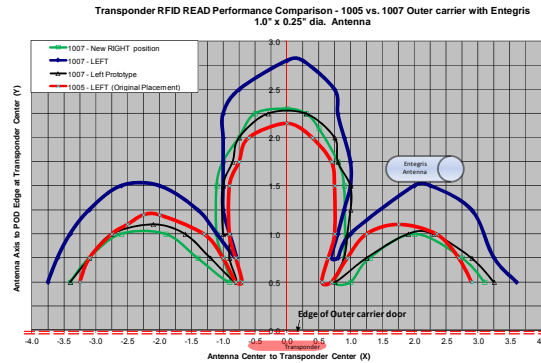
Agenda

- Development of EUV pod
- Improved Design of 1007 EUV Pod
- EUV Pod for Reticle with Pellicle
- Summary

Entegris EUV Carrier Development Milestones



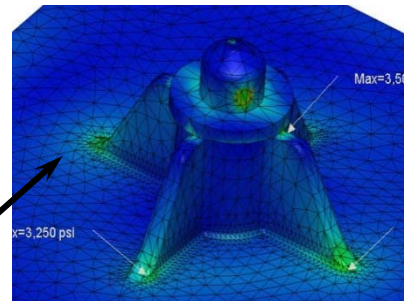
Improvements learned from *Experience* – New 1007 Design



New RFID holder and optional locations with mapping to verify performance



Molded in BC label



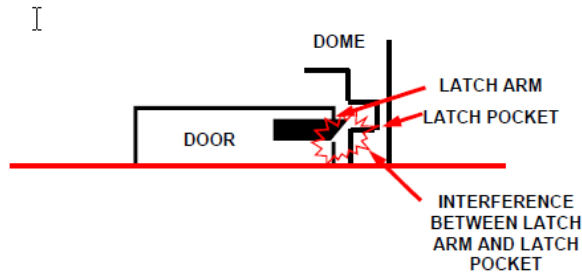
Improved Strength

1007 Design - New latch alignment improves latching precision

Background

NOK

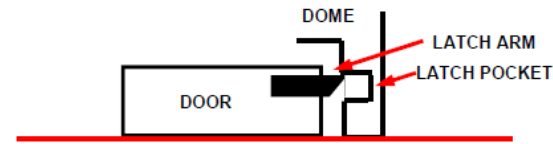
Door not fully seated in dome



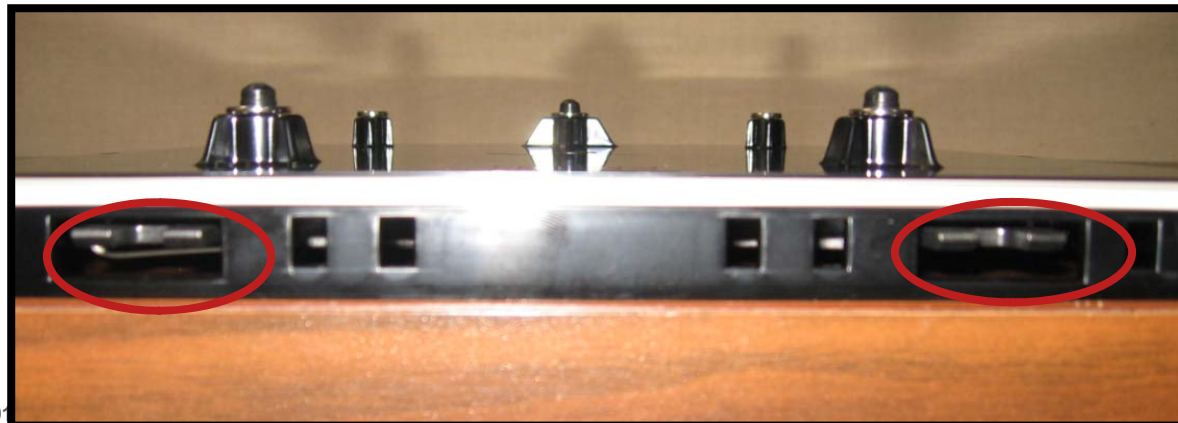
- Loadport must fully seat door into dome
 - Compressing gasket
 - Actuating reticle retainers
- Standard E19.4 loadport may NOT seat door fully into dome
- Causes latch arms to contact dome pocket
 - Creates increased particle generation
 - Causes increase in latch torque beyond SEMI specification
 - Potential damage to outer pod and latch arms

OK

Door fully seated in dome

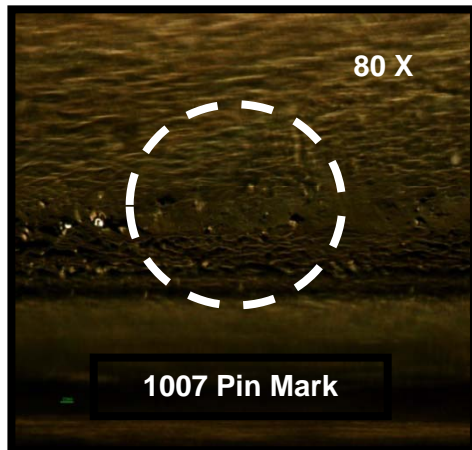
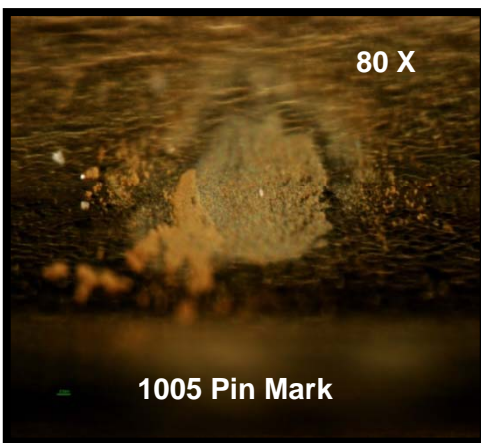
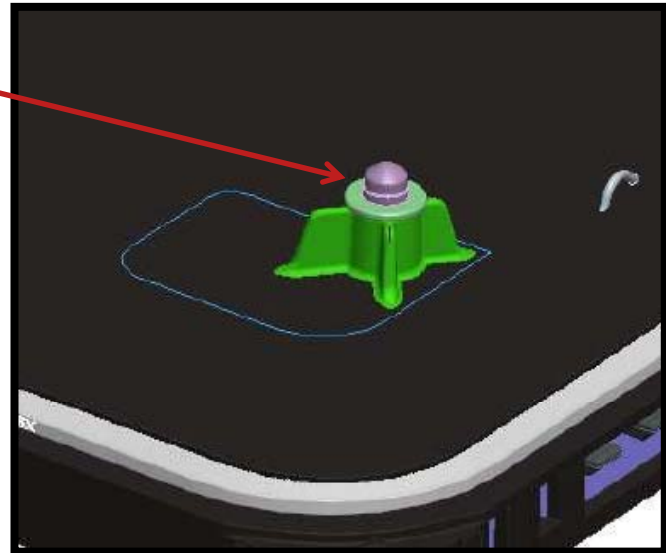
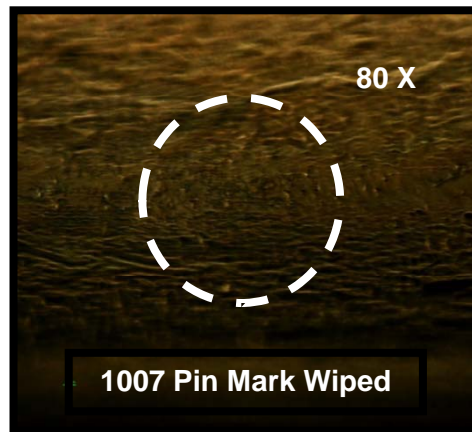
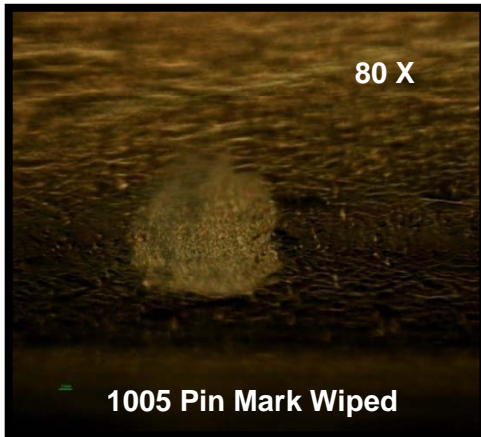


- Loadport returns door to correct position
- Latches are at optimal position to minimize particle generation between latch arm and latch pocket
- Torque required to actuate door remains within specification



1007 Design - KC Pin material to improve wear & friction properties

KC Pin shown assembled into door



Third Generation Inner Pod Flexure Design in EUV 1007

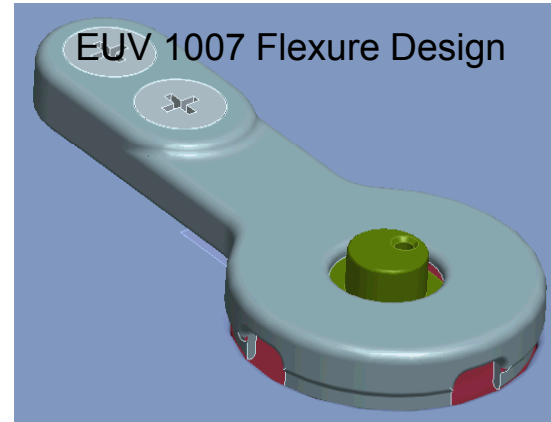
Builds upon flexure strengths while eliminated weaknesses

EUV 1005 Design

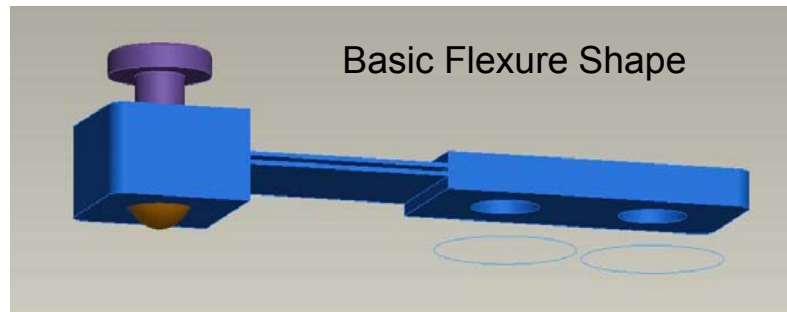


Low energy compression seal

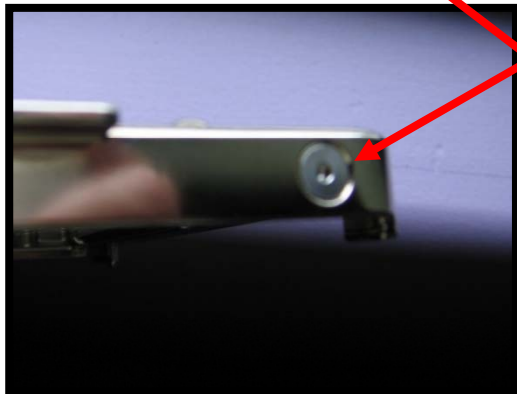
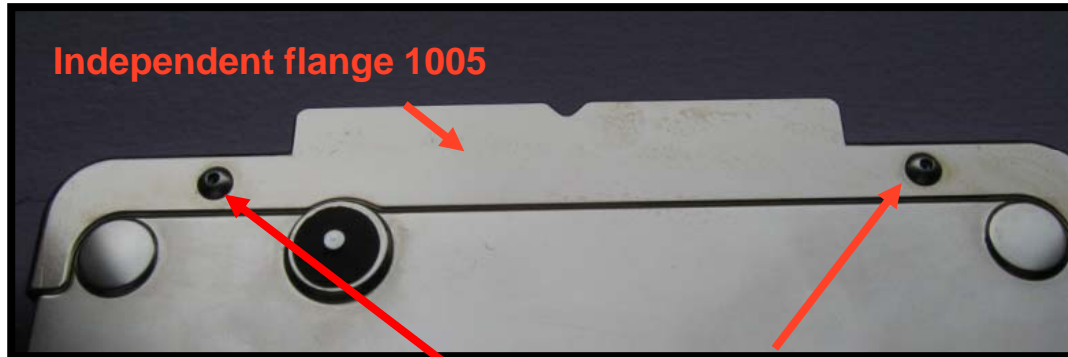
EUV 1007 Flexure Design



Basic Flexure Shape



1007 Design - Eliminated independent flanges and (8) screws



Attachment
screws - 1005

Integrated flange
- 1007

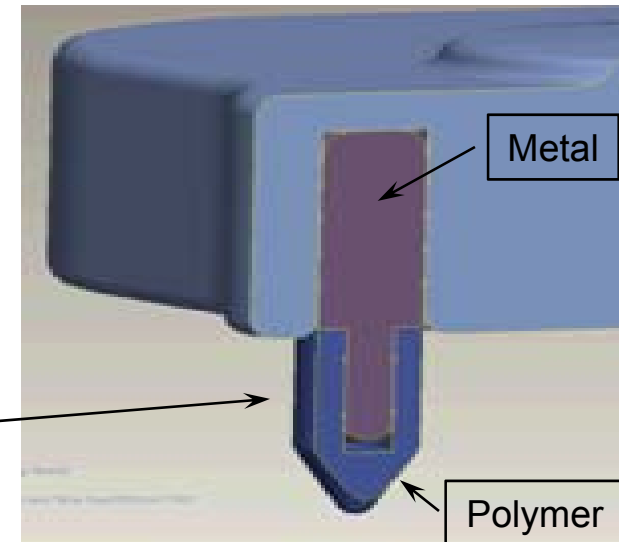
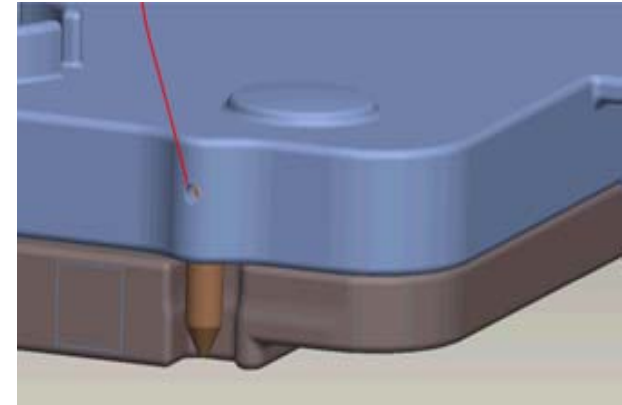
External flexure
mounting - 1007



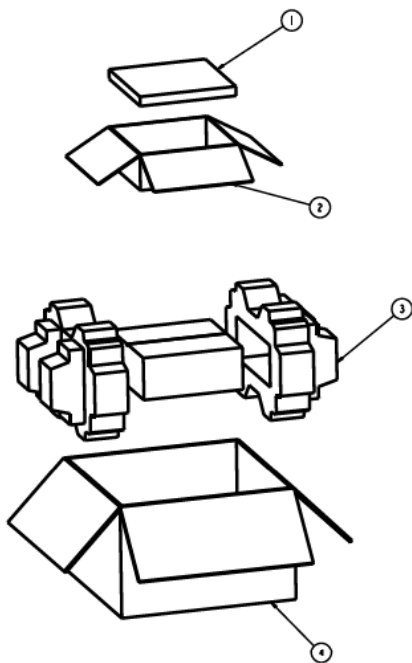
Inner Pod Improvements in 1007

- New Electroless Nickel plating to improve resistance to staining in cleaning tool
- New base plate manufacturing process to improve surface finish quality
- Move flexure to the outside of cover from the inside
- Integrate handling flanges into the cover to eliminate screws and pockets for particles
- New cover to base plate alignment feature (see images) to reduce metal on metal wear potential.

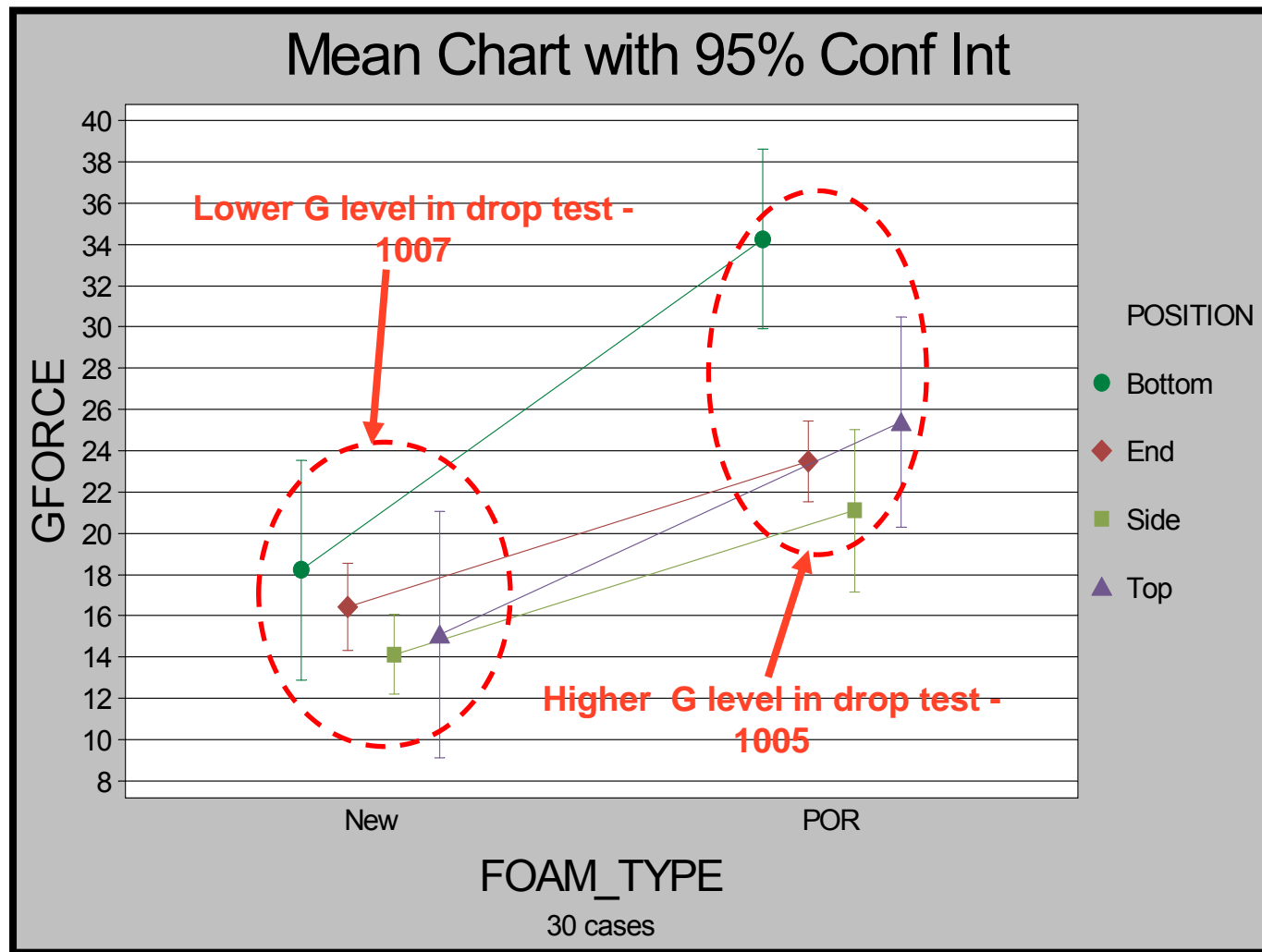
Polymer tipped metal pin provides strength and dimensional accuracy while the polymer provides outstanding wear properties. Same concept is used on the Outer carrier KC pins. This is an example of second generation product improvements



Improved secondary packaging materials



Packaging system remains the same, material properties provide the improved reticle protection



ISTA 3A Drop Test particle results on EUV 1007 in second generation packaging

ASML Bins	Front side		Back side	Remark
	QAi ($\geq 85\text{nm}$)	QAo($\geq 200\text{nm}$)	QA($\geq 3.0\mu\text{m}$)	
Mask 1	1~2	1~2	0	Front: Possibly particle moving
Mask 3	2	2	0	Back: 1 detect out of 3 scans
Mask 4	0	0	0	Front: 1 detect out of 3 scans

All Particles	Front side		Back side	Remark
	QAi ($\geq 85\text{nm}$)	QAo($\geq 85\text{nm}$)	QA($\geq 85\text{nm}$)	
Mask 1	1~2	1~2	0	Front: Possibly particle moving
Mask 3	2	2	0	Back: 1 detect out of 3 scans
Mask 4	0	0	0	Front: 1 detect out of 3 scans

- Entegris has the capability to rapidly test and improve with in house resources. The above is one example where a new generation of secondary packaging was developed to improve shipping performance.

1007 Update - ASML EPS specification and approval for use test

Entegris 1007 EUV-pod report card for standard tests

ASML
Confidential
and As Is

January 2013

Test	Entegris EUV-1007A-A120
Inspection Tests	
Mechanical Measurements	Pass (Supplier)
Visual inspection	Pass (Supplier)
Functional Tests	
Sensor tests including target reflectivity test	Pass
Full system cycle test	Pass
Outgas	
EIP outgas test	Pass
Particle adder measurements	
RH transfer path test	Pass
In-system habitat test (venting)	Pass

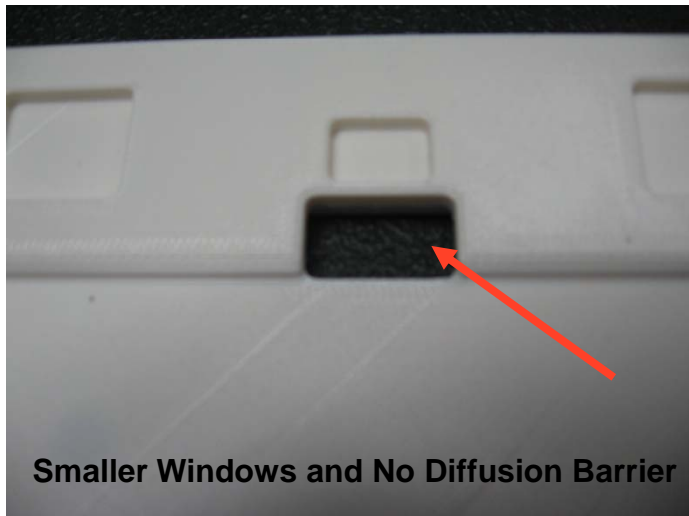
New Pod Design for Reticle with Pellicle

Pellicle Pocket Baseplate Prototype



Pellicle Pocket – no diffusion barrier (small gap between baseplate and reticle)

Removed pockets to maintain weight and center of gravity



Smaller windows

Smaller Windows and No Diffusion Barrier



Summary

- EUV-1007 has been qualified and released
- EUV-1010 product is under development
- Entegris continuing investment into EUV and improve our product

