

# Reticle Handling Survey

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**A short survey was distributed in December 2002 to assess company opinions on EUV reticle handling. This was intended to bring focus to a few high-level issues: carrier external form factor, mask handling assist features, and chucking approach.**

# Q1: Respondent profile

## My company is primarily involved in:

Integrated device manufacturer	3
Capital equipment manufacturing	4
Support/component equipment manufacturing (carriers, subsystems, etc.)	0
Mask manufacturing or mask supply chain (substrates or blanks)	5
R&D consortium	0
Consulting	0
Other	0

Company responses: 11 (one respondent selected two line items)

## Q2: Mask chuck preference

### My company's preference is for a:

Slab style electrostatic chuck (flat, no pins)	0
Three-point pin electrostatic chuck	0
Waffle-style pin electrostatic chuck (fully covered with uniformly pitched pins)	2
Vacuum chuck	0
Electrostatic/vacuum hybrid chuck	0
Other (please describe)	2
No opinion	5

Company responses: 11 (two respondents selected multiple options)

## Q2: Chuck preference by operation

### Chuck preferences:

	<u>single choice</u>	<u>multiple choices</u>
Mask blank resist coat	0	vacuum(2)
Mask write	5 <sup>2</sup> 3-point mech., ES pin, no op(2)	ES pin, 3-point mechanical, 3-point kinematic
Mask develop	0	3-point kinematic
Mask repair	2 no opinion(2)	no opinion
Mask metrology <sup>1</sup>	3 vacuum, no op(2)	ES pin, vacuum, kinematic, 3-point kinematic
Mask inspection <sup>1</sup>	3 ES pin, no op(2)	ES 3-point, ES pin, vacuum(2)
Mask exposure	4 <sup>2</sup> ES pin(2), no op	ES pin(2), ES slab, 3-point ES

<sup>1</sup>One very detailed response:

Mask flatness metrology: vacuum or kinematic

Mask pattern metrology: vacuum (in air), ES pin (in vacuum)

Mask particle inspection: vacuum (in air), ES pin or ES 3-point (in vacuum)

<sup>2</sup>One response for “e-chuck, not 3-point, compatible for these tools”.

## Q2: Comments

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**This should be determined by the equipment makers.**

**We would prefer a chuck consistent between tools.**

## Q3: Reticle carrier preference

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### My company's preference for a reticle carrier design is:

200mm Standard Mechanical Interface (SMIF)	7
150mm SMIF	2
FOUP (Front Opening Unified Pod) (size to be determined)	1
Other (please describe)	0
No opinion	2

Company responses: 11 (one respondent selected two line items)

# Q3: Reticle carrier compared to 10/02 responses

## Reticle carrier design preference:

	Feb '03	Oct '02
200mm Standard Mechanical Interface (SMIF)	7	6
150mm SMIF	2	1
FOUP (Front Opening Unified Pod)	1	0
No opinion	2	
Single capacity		10
Multiple capacity		0

## Q3: Comments

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**[Selected carrier] for mask house internal handling, external carrier open.**

# 200mm Carrier



# 200mm Carrier compared to typical Toppan clamshell



## Q4: Reticle assist features preference

**Is your company considering any sort of handling assist features incorporated into the mask form factor, and if so, what style?**

No assist features, just the basic substrate.	2
Yes, a groove or slot around the edge of the substrate.	0
Yes, divots/holes along the edge of the substrate to allow pins.	1
Yes, areas on the patterned side or backside, cleared of films, to allow contact only to the substrate.	4
Other	0
No opinion	6

Company responses: 11 (two respondents selected two line items)

## Q4: Comments

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**The tool supplier will probably drive decision.**

# Summary

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- **200mm SMIF is the most popular carrier option.**
- **Modifying the mask form factor for handling assist features is unlikely -- only one response in support of modification.**
- **Areas on the mask for gripping, cleared of films, are of interest.**
- **No clear preference for chuck style, overall or at any one operation, though electrostatic approaches have support in general.**