

# **EUV Reticle Handling Implementation**

— Discussion Topics

**@ IEUVI TWG, 02.27.11**

# Simplified Mask Flow

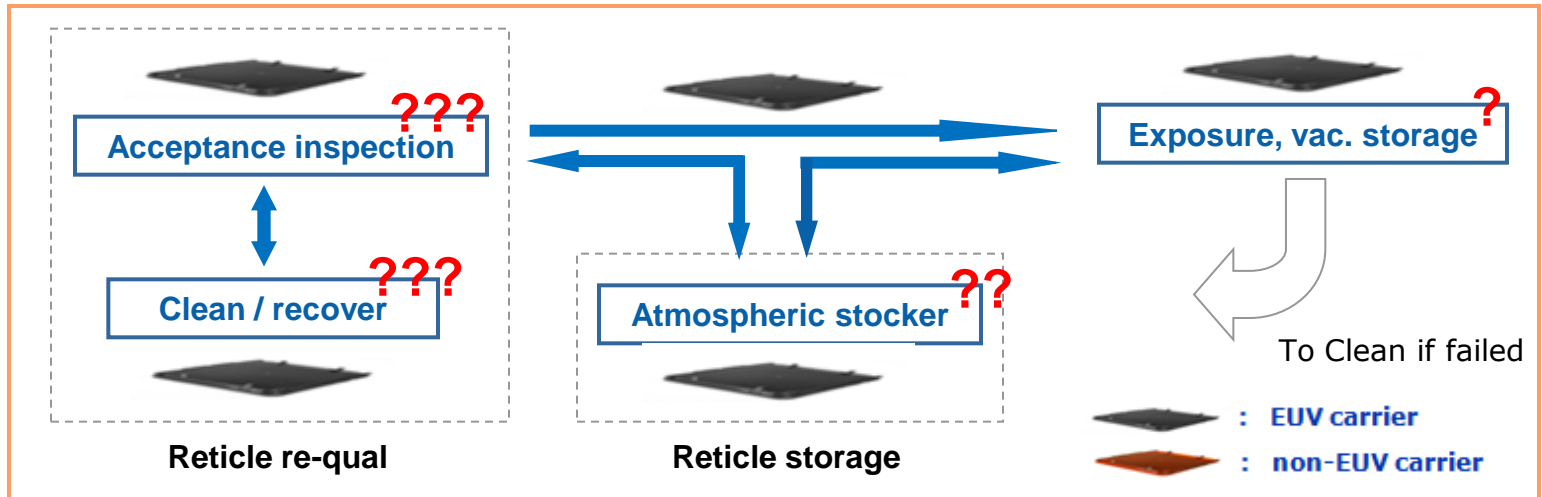
## Blank shop



## Masks hop



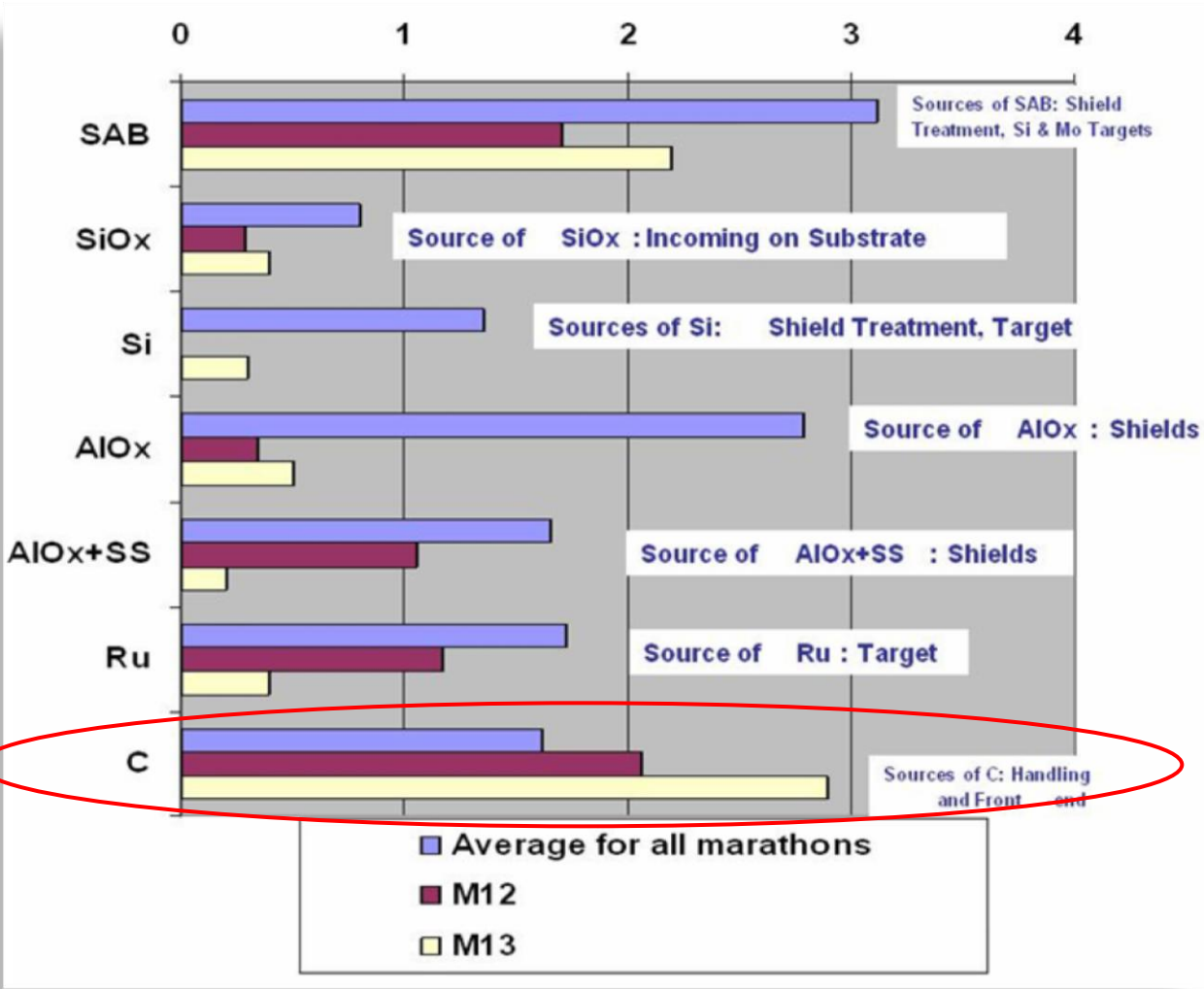
## Wafer Fab



# Handling Caused ML Defects

Can we absorb the level of handling caused ML defects?

ML defects caused by handling particles



(Courtesy of Frank Goodwill/SEMATECH)

# Ballpark of Optical Mask Shipping

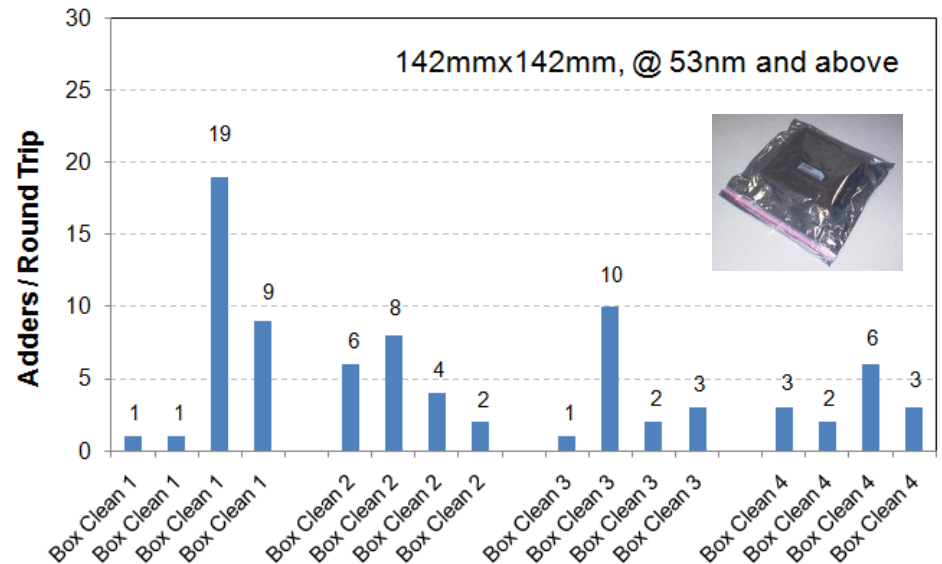
## Conclusion:

- **Particle ballpark is in single digits.**
- No significant dependence found on different box cleans

## Test definition:

- 8 Pozzetta compacts, 4 clean suppliers, 2 identical boxes, 4 slot per box, 8 Qz plates
- Completely mixed for comparison

## Baseline performance of EUV blank shipping with supplier-specific boxes?



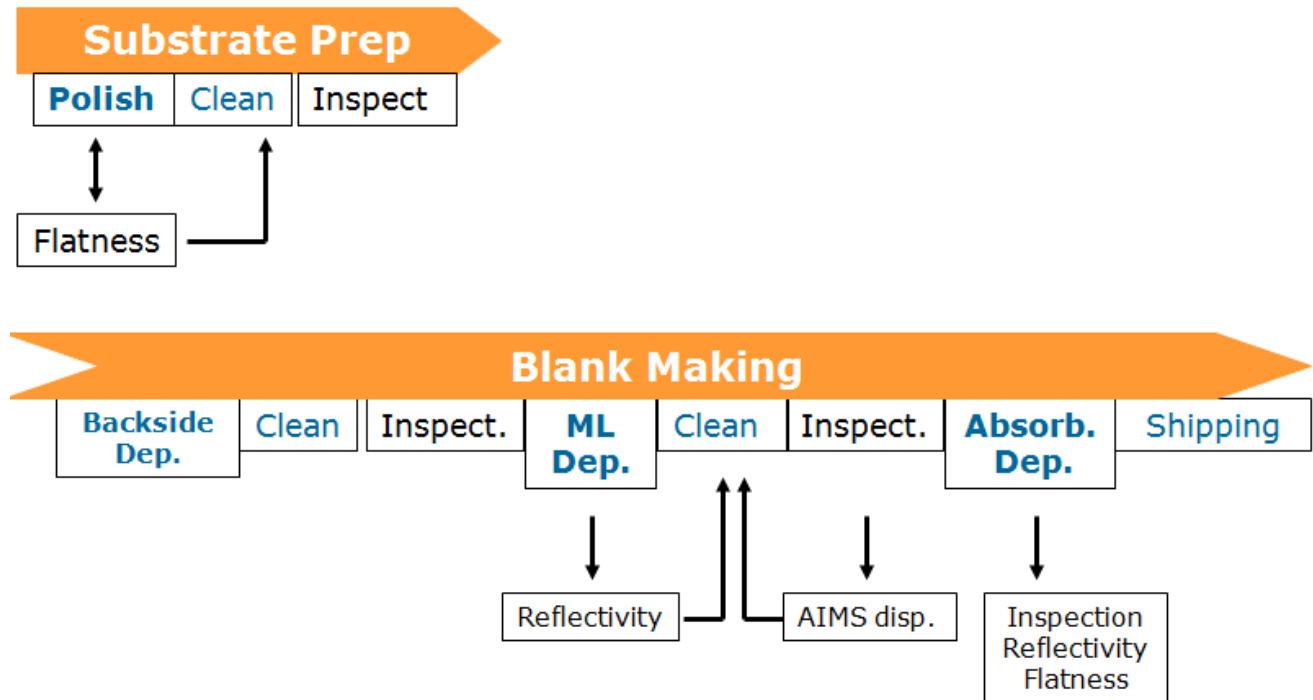
	Overall	Shipping	Box	Slot	Claen Supp.
1	4.1	4.0	2.8	3.5	3.7
2		4.1	5.3	1.8	5.0
3			4.0	3.8	4.0
4			4.3	3.8	3.5

Particle adders averaged for overall, per shipping, per shipping box, per carrier slot positions inside the box, and per box clean supplier (@53nm sensitivity)

# If EUV-pod Needed in Blank Shops?

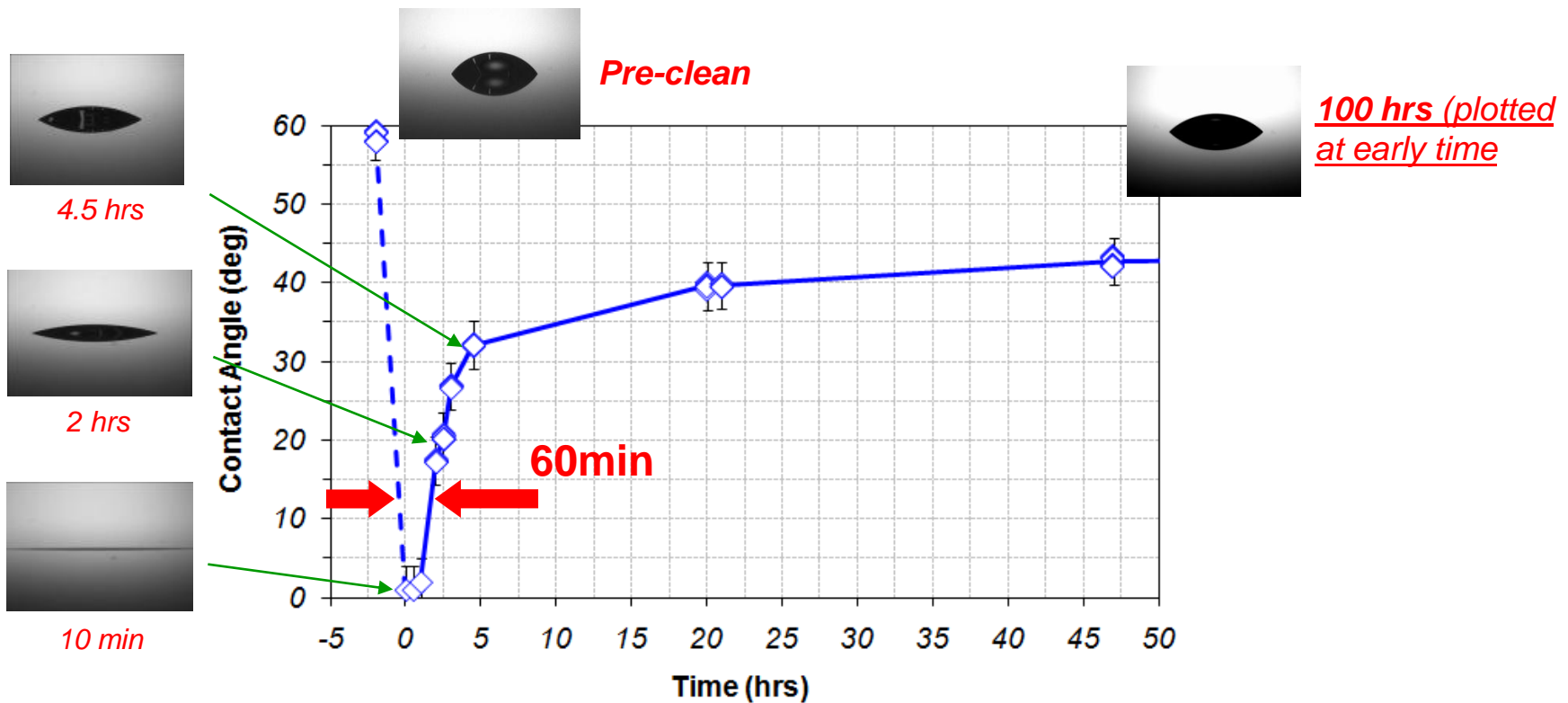
1. Blank defects caused by handling particles :
  - ML defects; Absorber defects
2. What are the expectations when blanks arrive at mask shops?
  - Capped ML stack; Absorber; Resist coated
3. If EU-pod needed? Inside blank shops and/or blank shipping?

## Blank Making Flow:



# Surface Contamination After Final Clean

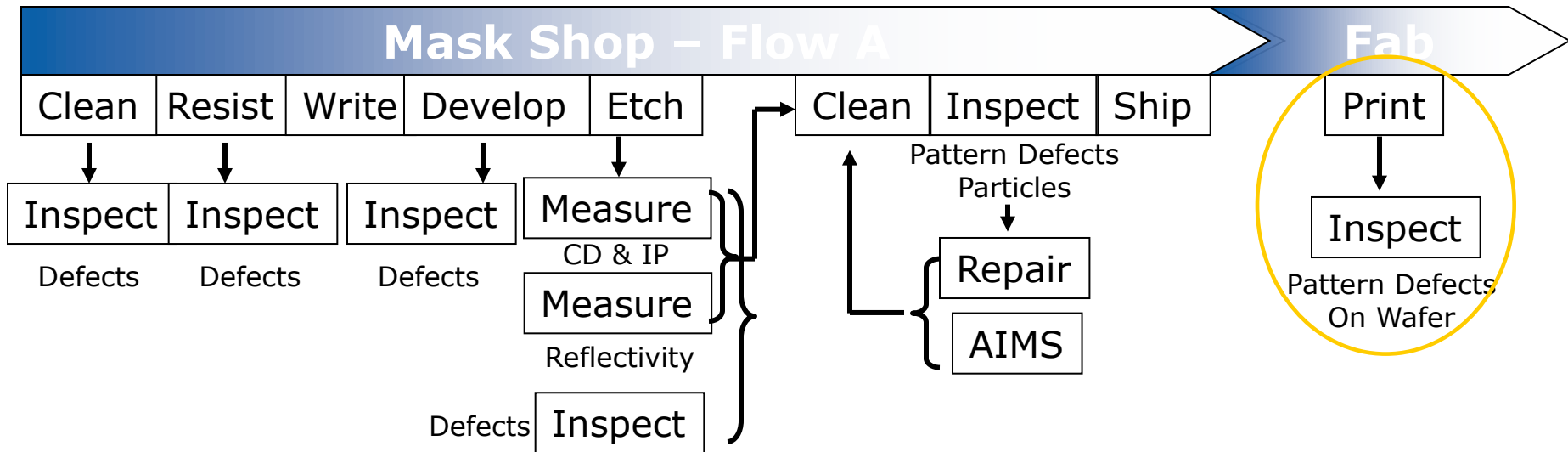
- Mask stays “*clean*” for ~60 min.
- Should “*the last tool*” in mask shop be final clean, when needed to minimize surface contamination?



EUV blank contact angle increases vs. time after final clean.

# Which is “The Last Tool” in Maskshops

- Final inspection or Final clean?
- Which needs EUV-pod capability or both?



# Wafer Fab

1. Will the incoming inspection be necessary?
2. What are likely tool options for wafer fab inspection and clean?
3. How to manage backside particles?
4. What should be the right capacity for in tool storage?
5. Need in-tool mask inspection, front, back?
6. Atmospheric storage:
  - Gas options?
  - Number of purging ports?
  - Does purging make any significant difference, in term of wafer yield?

