

## **Minutes of EUV Subcommittee meeting, San Diego, CA**

Time: 1:00 PM - 5:00 PM

November 10, 2005

Represented companies:

Many, part of this list includes; **IMEC, ASML, Brooks, Entegris, Intel, KLA-Tencor, Nikon, SEMI, SEMATECH,**

### **Minutes**

#### **1. Public meeting notice**

Phil S. explained the SEMI meeting requirements.

#### **2. Appreciation:**

- Scott Hector for his standards help, he is now going back to Freescale
- Thanked the “mini-team” for their recent help
- Welcome to Asian and European guests

#### **3. EUV Standards Update**

- P37 EUV mask substrates
- P38 EUV mask blanks and absorber films
- P40 EUV mask chucking
- Standard: Mask ID marks

- Showed proposed standards schedule

P37-1102 Ready for updated yellow ballot

P38-1103 Starting discussion, no changes planned today

P40-1103 Standard being challenged

**EUV Mask Carriers:** Trying to get a workable spec

- Present designs not adequate for future needs
- Many initial ideas out there
- Now we need to gather data so that workable requirements can be created

#### **4. History**

Phil S. explained the committee history and briefly explained the background and status of the two-pass surveys. Also explained how the data was summarized and collated. The flow was from “questions to ask” to what “data to acquire” and this should lead to a list of the “must have” items for the spec.

“Must Haves” went from 155 down to 35 and “Data to Acquire” line items went from 71 to 20 by using mapping from the survey results.

Committee is also working on determining the acceptable handling area on the masks. Requests have been sent out to member companies for feedback on the handling areas.

- Contact area map sent to 40 companies

#### **5. Mask substrate/flatness, U.of Wisc (Roxanne Englestad)**

- Showed mask bow and discussed in-plane stresses
- Affect of chucking on stress
  - Bow can be chucked flat, but too large of an amplitude may require a stiffer chuck to make it flat
- SEMP P37 and P40
  - Discussed Best Fit Plane and different methods of measuring it
  - The Minimax method should be used instead of the least squares method, which is commonly used for wafer flatness
  - Also how many times do you have to measure to get a value that is representative

**AR** Phil S. to gather feedback from members on flatness measurement techniques deployed.

#### **6. Intel discussions on in fab carrier and shipping carrier (Mike Salib)**

- Would like to suggest two standards;
  1. In fab carrier-current focus
  2. Shipping carrier – needs equal attention
- Discussed bracket design
  - Horizontal shipping, mask-side down, showed only 1 particle added at 60 nm. We really need to see smaller particles but we are at the limits of the inspection tool capability.

**AR** Phil G. and the mini-team to finish filling in the ‘Data to Acquire’ section and present the file in San Diego.

#### **7. EUV shipper results from Entegris (Stephen Sumner)**

- Initial product made of polymers, but might mfg out of other materials in the future.
- Whole part cleaning and proper secondary packaging improves the shipping results.
- Most shippers left 1 or 0 particles at 60nm on the wafers after 1-way shipment.
- Pattern side up or down did not impact particles.
- Packages in top of box showed more particles than those in the middle
- Areas for further improvement; cleaning, secondary packaging, materials, handling
- Entegris ready for the next phase

#### **8. AMTC Mask Carrier Considerations (U. Dersch)**

- Want indirect touching of the mask

- RSP150 is not adequate, too small, old technology
- New carrier needs to be pod, top opening, bottom opening, or front side opening
- compared different pod advantages
- Should the carrier be part of the vacuum chamber?
- FORP (Front Opening Reticle Pod)
- AMTC wants
- Want 1 carrier for shipping and fab
- Do not want carrier in vacuum
- Would like the FORP, front opening

## 9. Lifecycle of a reticle (Stephen Sumner)

Showed steps in the life of a reticle, slides originally created by ASML

- Add E-beam expose add step
- Add backside deposition

**AR** Long to send out flow diagrams to team for feedback and recommended changes

## 10. Must Haves discussion

Long showed the updated “Must Haves” section of the survey, discussed. This has been sent out for review by team members.

Questions:

Nikon asked if we should have a separate standard for the blanks. This is handled under the ‘questions to answer’ section.

Intel asked what our timeline is planned to be for balloting. They agree that the survey was a good place to start.

How did we come up with the 5mm contact area on the reticle?

**AR** Phil S. to find out origin of 5mm contact

Does P38 require the carrier to have a frame? We don’t think so.

Will we have enough time to gather data before next summer? The group thinks maybe not.

## 11. Wrap up

- Gathered information on general topics that we could work on prior to SPIE
  - The team agreed to meet in San Jose
  - Suggestion that we need to work on building the standard (a full day)

**AR** Send out information of P37, P38 ahead of SPIE meetings so that we can decide if those, or other, specs need to be changed

The next gathering of the team will be in February in San Jose at the SPIE conference. That meeting will be a detailed working level meeting for the team.

**Thanks for everyone's support in making this meeting a success!**