Silicon Wafer NA TC Chapter
Meeting Summary and Minutes

NA Spring Meetings
Tuesday, March 26, 2024
9:00 AM – 11:30 AM
SEMI HQ, Milpitas, CA

TC Chapter Announcements

Next TC Chapter Meeting
Tuesday, July 9, 2024, San Francisco, CA in conjunction with SEMICON West Meetings. Check www.semi.org/en/standards for the latest update.

Table 1 Meeting Attendees

Co-Chairs: Noel Poduje (SMS), Dinesh Gupta (STA)
SEMI Staff: Kevin Nguyen (SEMI HQ)

Company	*Last*	*First*	*Company*	*Last*	*First*
ASML	*Daware*	*Ajinkya*	*SUMCO*	*Nakai*	*Tetsuya*
Wooptix	*Gaudestad*	*Jan*	*Siltronic*	*Passek*	*Fritz*
Global Wafers Japan	*Grabbe*	*Alexis*	*SMS*	*Poduje*	*Noel*
STA	**Gupta**	**Dinesh**	*Okmetic*	*Santala*	*Petri*
KLA	*Haller*	*Kurt*	*GlobalWafers*	*Takeda*	*Ryuji*

Italic indicates remote participant. Bold indicates in person participant.

Table 2 Leadership Changes

WG/TF/SC/TC Name	*Previous Leader*	*New Leader*
None		

Table 3 Ballot Results

Document #	*Document Title*	*Committee Action*
None		

#1 **Passed** ballots and line items will be submitted to the ISC Audit & Review Subcommittee for procedural review.
#2 **Failed** ballots and line items were returned to the originating task forces for re-work and re-balloting or abandoning.

Table 4 Ratification Ballot Results

Document #	*Document Title*	*ISC A&R Action*	*A&R Forms*
None			

Table 5 Activities Approved by the GCS between meetings of the TC Chapter

#	*Type*	*SC/TF/WG*	*Details*
None			

Table 6 Authorized Activities

#	*Type*	*SC/TF/WG*	*Details*
7223	SNARF	Int'l ASI TF	Reapproval of SEMI M35-1114 (Reapproved 1019) Guide for Developing Specifications for Silicon Wafer Surface Features Detected by Automated Inspection
7224	SNARF	Int'l Test Methods TF	Reapproval of SEMI MF1528-0413 (Reapproved 1018) Test Method for Measuring Boron Contamination in Heavily Doped N-Type Silicon Substrates by Secondary Ion Mass Spectrometry

NOTE 1: SNARFs and TFOFs are available for review on the SEMI Web site at: http://downloads.semi.org/web/wstdsbal.nsf/TFOFSNARF

Table 7 Authorized Ballots

#	*When*	*SC/TF/WG*	*Details*
7223	Cycle 3 or 4 of 2024	Int'l ASI TF	Reapproval of SEMI M35-1114 (Reapproved 1019) Guide for Developing Specifications for Silicon Wafer Surface Features Detected by Automated Inspection
7224	Cycle 3 or 4 of 2024	Int'l Test Methods TF	Reapproval of SEMI MF1528-0413 (Reapproved 1018) Test Method for Measuring Boron Contamination in Heavily Doped N-Type Silicon Substrates by Secondary Ion Mass Spectrometry

Table 8 SNARF(s) Granted a One-Year Extension

#	*TF*	*Title*	*Expiration Date*
None			

Table 9 SNARF(s) Cancelled

#	*TF*	*Title*
None		

Table 10 Standard(s) to receive Inactive Status

Standard Designation	*Title*
None	

Table 11 New Action Items

Item #	*Assigned to*	*Details*
None		

Table 12 Previous Meeting Action Items

Item #	*Assigned to*	*Details*	*Status*
July2023-#1	Ajinkya Daware (ASML), Dinesh Gupta (STA), and Kevin Nguyen (SEMI)	To work on the survey for Revision of SEMI M1 (Subject: 300 mm wafer diameter changing tolerance ±200 um to ±100 um)	Completed

1 Welcome, Reminders, and Introductions

1.1 Noel Poduje called the meeting to order at 9:00 AM. The meeting reminders on antitrust issues, intellectual property issues and holding meetings with international attendance were reviewed. Attendees introduced themselves. Noel requested staff to investigate ways for members to introducing themselves since there are people in person as well as online.

2 Review of Previous Meeting Minutes

2.1 The TC Chapter reviewed the minutes of the previous meeting.

Motion: Accept the minutes as written.
By / 2nd: Friedrich Passek / Siltronic AG
Kurt Haller / KLA-Tencor
Discussion: None
Vote: 8-0

3 Review of Schedule for the next meeting (SEMICON West, July 2024)

3.1 Draft schedule is attached.

Attachment: Wafer West 2023 schedule

4 Liaison Reports

4.1 *Europe TC Chapter*

4.1.1 Fritz Passek reported. Of notes

- Last meeting
  - November 16, 2023
- Next meeting
  - SEMICON Europa, November 2024
  - Check www.semi.org/standards for the latest update
- Leadership changes
  - Int'l Test Methods TF
    - Peter Wagner (Self) steps down
    - Thomas Hager (Siltronic) – New leader
  - Int'l Terminology TF
    - Peter Wagner (Self) steps down
    - No leader is identified.
- New SNARFs
  - 7162, New Standard: Test Method for epi-resistivity determination in Si wafers by Surface Charge Profiling
- Authorized ballots
  - Doc. 7024, Line Item Revision to SEMI M1-0918 Specification for Polished Single Crystal Silicon Wafers (Diameter tolerance reduction for 300 mm wafers)
- Int'l Advanced Wafer Geometry TF
  - Ballot Development
    - 6983, Revision for SEMI M49, Guide for Specifying Geometry Measurement Systems for Silicon Wafers for the 130 nm to 16 nm Technology Generation
  - New Business

  - SNARF: Revision of SEMI M73-1013E (Reapproved 1019): Test Method for Extracting Relevant Characteristics from Measured Wafer Edge Profiles to include new metrics characterizing Edge Roundness
  - Frank Riedel presented the draft of the SNARF.
  - SNARF will be issued once the patent referred to is published.

- Int'l Automated Advanced Surface Inspection TF
  - New Business
    - Status of AFM Roughness Working Group Activities
      - WG leader Judith Wittmann (Siltronic AG) compiled the current status
    - Status of Haze Working Group Activities
      - WG leader Kurt Haller (KLA) gave a verbal summary on the current status
- Int'l Polished Wafer TF
  - Ballot Development
    - Doc #7024 - Line Item Revision to SEMI M1-0918 Specification for Polished Single Crystal Silicon Wafers (Diameter tolerance for 300 mm wafers)
      - Result of industry-wide survey on reducing current 300 mm tolerance specification
        - 24 responses: a clear majority in favor of 300.00 ± 0.1 mm mainly due to capability reasons
- Int'l Test Methods TF
  - SEMI Working Group – Phase Out of Mercury
    - A generic project plan was generated and is updated in each meeting.
    - Focus will be on SCP (Surface Charge Profiling) method as a first step.
    - Drafting doc. 7162, New Standard: Test Method for epi-resistivity determination in Si wafers by Surface Charge Profiling
  - A New Metric for Wafer Flatness: Edge Roundness
    - Current parameters for specifying wafer edge shape according to SEMI M73 do not address the transition region between inner surface of wafer and its edge.

Attachment: EU Si Wafer TC Chapter Liaison Report Dec 2023 v1

4.2 *Japan TC Chapter*

4.2.1 Nakai-san reported for the Japan TC Chapter.

- Last meeting
  - Wednesday, December 14, 2023, in conjunction with SEMICON Japan 2022
  - Tokyo Big Sight, Tokyo, Japan + OVTCCM (Hybrid)
- Next meeting
  - Thursday, April 26, 2024

- OVTCCM
- Leadership Changes
    - International Test Method TF
        - Mikako Omata (SCAS) (new)
    - Int'l Polished Wafers TF under Europe Silicon Wafer TC Chapter
        - Christina Sanna (GlobalWafers) (New)
    - Int'l Advanced Surface Inspection TF under Europe Silicon Wafer TC Chapter
        - Judith Wittmann (Siltronic) (New)

Attachment: JA SiW 20240426_Liaison v1.0

5 SEMI Staff Report

5.1 Kevin Nguyen (SEMI) gave the SEMI Staff Report. Of note:

- SEMI upcoming event
    - SEMICON West, July 9-11, 2024
    - San Francisco, CA
    - SEMICON West Registration is open
        - SEMI Standards discounted rate or complimentary (Expo Pass) link:
        - https://bit.ly/SW_Standards_24
- 2024 Critical Dates for SEMI Standards Ballots
    - https://www.semi.org/en/collaborate/standards/ballots
- Standards Online Voting System Updated
    - New system went live for Cycle 3, 2024
    - https://www.semi.org/standards/ballots or https://portal.semi.org
    - The new voting system:
        - Integrates and streamlines sign-in process with various SEMI/Standards member services
        - Aims to bring updated user interface while maintaining functionality that's familiar to voters
        - Improves data management for SEMI internal database
- Regulations and Procedure Manual Updates
    - Regulations (Feb 20, 2024)
        - New definition of "Standards Document"
        - Clarification of confidential presentation materials
        - https://www.semi.org/sites/semi.org/files/2024-02/Standards%20Regulations%20February%2020%202024.pdf
    - Procedure Manual (Feb 20, 2024)
        - The use of Connect@SEMI for TF management and document development depository
        - Clarification on meeting quorum
        - TC Chapter Committee Express Report (CER) timing
        - Deletion of Appendix 4 - Nonconforming Standards Titles
            - https://www.semi.org/sites/semi.org/files/2024-02/Procedure%20Manual%20February%2020%2C%202024.pdf
        - The Use of Connect@SEMI for TF Management and Document Development Depository

- Refer to PM § 6.4.5 Operation of TFs
  - Task Forces have one year from 02/20/24 to implement use of Connect@SEMI. (https://connect.semi.org)
  - Once TFs have implemented use of Connect@SEMI, they shall use it to:
    - Maintain the TF member roster up to date.
    - Share the working drafts.
      - The default format for working Draft Document sharing shall be Adobe Acrobat PDF.
    - Distribute the Draft Document at least one week before ballot submission to SEMI.
- New Meeting Required Elements
  - https://www.semi.org/sites/semi.org/files/2024-03/Required%20Meeting%20Elements%20March%202024.pptx
- SEMI Standards Publications
  - Total SEMI Standards in portfolio: 1,086
    - Includes 335 Inactive Standards

Attachment: Staff Report March 2024 v4

6 Regulations Change Report (if applicable)

6.1 Report was given in staff report in section 5 above.

7 Ballot Review

7.1 None

8 Task Force Reports

8.1 *Int'l Advanced Wafer Geometry Task Force /Noel Poduje (SMS)*

8.1.1 Noel reported. Of note:

- Ballot Review
  - Document 7163 Preliminary Review

    REAPPROVAL OF SEMI MF1530-0707 (Reapproved 1018) TEST METHOD FOR MEASURING FLATNESS, THICKNESS, AND TOTAL THICKNESS VARIATION ON SILICON WAFERS BYAUTOMATED NONCONTACT SCANNING".

    This ballot has no reject or comment.
- Ballot development
  - 1) 7192 - Revision of SEMI M73-1013 TEST METHOD FOR EXTRACTING RELEVANT CHARACTERISTICS FROM MEASURED WAFER EDGE PROFILES
    - Fritz (Siltronic) presented a new technique for evaluating Edge Roundness from edge profile data. This applies to the wafer surface just outside the FQA. His approach reports a Roundness Radius and a Roundness Angle. There is a concern among wafer users that too small a radius and/or too large an angle can lead to film delamination and other issues.

    - Higashi (SUMCO) presented an alternative technique which calculates the second derivative of the edge profile outside the FQA. The largest negative value is the reported metric.
    - There was a draft document from EU available but it was not reviewed at this time. Rather, the interested parties (Siltronic and SUMCO) will work together to incorporate both techniques into the draft, to be reviewed at West. There was discussion regarding correlation of the techniques (reportedly high) and profile data acquisition (shadow, camera, confocal microscope).
  - 2) 6983A - Revision of SEMI M49-0918 With Title Change To: Guide for Specifying Geometry Measurement Systems for Silicon Wafers for the 130 nm to 3 nm Technology Generations
    - Yoshi led a review of the latest draft of the M49 revision. In addition to error corrections and editorial changes, this draft attempts to address the issue of reference wafer values for the 11-3nm TGs in Table 4. It pauses scaling, leaving the values mostly at the 16nm level. It also adds wording to Purpose, Scope and Sec. 5 emphasizing that the values are guidance and that actual values are agreed upon between Supplier and User.
    - A lively discussion ensued. The main takeaways are: The values for 130 – 16nm TGs will remain. There is still no good agreement on the values for the 11 – 3nm TGs. Peter says that "we just don't know". The issue of backward compatibility for lithography with various tools was discussed.
    - There will be no ballot at this time. Also, the document as it stands is difficult to review because of many revisions in different colors. To ease this, Kurt has taken an action item to produce an easier-to-read version. This will have the proposed changes accepted to reduce the revision confusion. It will also have some of the recently added wording regarding reference values modified and will have a new Table 4, or perhaps not a table, for the 11 – 3nm TGs. A date of April 15 was set to circulate this for review.

- New Business
  - 1) 300mm diameter tolerance.
  - A ballot to change the diameter tolerance, Doc. 7024, got a Negative questioning the necessity for the change. It was discussed in the PW meeting but there was not much participation so it was raised here. Dinesh made the request at PW for the author of the change (ASML) to provide information. Fritz agreed to pass this along.

Attachment: AWG NA Spring 2024

8.2 *Int'l Automated Advanced Surface Inspection Task Force/ Kurt Haller (KLA-Tencor)*

8.2.1 Kurt reported. Of note:

- Reports
  - Report: AFM Working Group. The WG has met monthly (except December) since mid-2023. Presentations and meeting minutes are posted to the Int'l Advanced Surface Inspection Task Force community library at connect.semi.org.
  - Kurt reviewed preliminary AFM-SSIS Haze correlations performed by KLA and SAG which show the default optical configuration adopted by most wafer makers correlates as well as alternative configurations having larger haze signals or larger spatial bandwidths do.
  - Many open questions with respect to AFM measurement settings, tip selection, and post-scan data processing remain. Nevertheless, the WG is nearing consensus on protocols that will evolve into a new SEMI Standard for prime wafer surface roughness AFM measurement. Seven companies (3

wafer houses, 4 OEMs) have agreed to engage in a 23-wafer AFM round-robin. The working group estimates it will start by May/June 2024.

- Old business
    - Kurt will follow up on Peter Wagner and Tom Germer's comments regarding LSE terminology in the latest version of M52 with a line item ballot, to be presented at SEMICON West.
- New business
    - Kurt will also remove references to 450mm wafers from M52 as a second line item, to be consistent with changes being made to M49. Kurt reviewed (very briefly) SEMI M35, up for 5-year review, and will pursue a simple reapproval ballot.
        - Motion: Authorize SEMI M35 for Reapproval Ballot for cycle 4 or 5 for review at West
          By: Kurt Haller / KLA-Tencor
          Second: Friedrich Passek / Siltronic AG
          Discussion:
          Result: 8-Y 0-N Voting Result: Pass - 100.00%. Voting Rule: Majority

Attachment: IAASI_Minutes_SEMI_Spring_NA_2024

8.3 *Int'l SOI Wafers TF/Gerd Pfeiffer (SOITEC)*

8.3.1 No meeting. Of note:

- The TF is still working on doc. 6583, New Standard: Specification for SOI Wafers for RF Device Applications.

8.4 *Int'l Test Methods TF/Dinesh Gupta (STA)*

8.4.1 Dinesh reported. Of note:

- All SEMI MFs documents are up to date except for
    - SEMI MF1528-0413 (Reapproved 1018) Test Method for Measuring Boron Contamination in Heavily Doped N-Type Silicon Substrates by Secondary Ion Mass Spectrometry,
- Motion: Authorize the document for line-item revision of MF1528 for cycle 4 for review in San Francisco meeting
  By: Dinesh Gupta / Semiconductor Technology and Applications
  Second: Friedrich Passek / Siltronic AG
  Discussion:
  Result: 8-Y 0-N Voting Result: Pass - 100.00%.

8.5 *Int'l Polished Wafer TF/TBD*

8.5.1 Dinesh reported. Of note:

- Doc. 7024, Line Item Revision to SEMI M1-0918, Specification for Polished Single Crystal Silicon Wafers (Change the 300 diameter tolerance from ±0.2mm to ±0.1mm)
    - Ballot received one reject. ASML was asked to provide justification for ballot 7024 and present at the next meeting in San Francisco.
    - Ajinkya (ASML) stated the reasons that have to do with lithography and device makers are demanding for better wafer edge improvement. Ajinkya will discuss internally and will share information at the next meeting.

9 Old Business

9.1 None

10 New Business

10.1 5 Year Review.

10.1.1 5-Year Review Standards are handled by various Task Forces.

11 Next Meeting and Adjournment

11.1 The next meeting is scheduled for SEMICON West, July 9, 2024 in San Francisco, CA. Refer http://www.semi.org/standards for the current list of meeting schedules.

11.2 Noel Poduje expressed sincere appreciation for international participation despite the odd time zone for some. Having no further business, a motion was made to adjourn. Adjournment was at 11:00 AM.

Respectfully submitted by:

Kevin Nguyen,
SEMI Standards Operations Manager
Phone: 408-943-7997
Email: knguyen@semi.org

Minutes approved by:

Dinesh Gupta (STA)	<Date approved>
Noel Poduje (SMS)	<Date approved>

Table 13 Index of Available Attachments[#1]

Title	*Title*
Wafer West 2024 schedule	Staff Report March 2024 v4
EU Si Wafer TC Chapter Liaison Report Dec 2023 v1	AWG NA Spring 2024
JA SiW 20240426_Liaison v1.0	IAASI_Minutes_SEMI_Spring_NA_2024

#1 Due to file size and delivery issues, attachments must be downloaded separately. A .zip file containing all attachments for these minutes is available at www.semi.org. For additional information or to obtain individual attachments, please contact [SEMI Staff Name] at the contact information above.