



Silicon Wafer NA TC Chapter Meeting Summary and Minutes

NA Spring Meetings
Tuesday, April 4, 2023
9:00 AM – 11:30 AM
SEMI HQ, Milpitas, CA

TC Chapter Announcements

Next TC Chapter Meeting

Tuesday, July 11, 2023, 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)

<i>Company</i>	<i>Last</i>	<i>First</i>	<i>Company</i>	<i>Last</i>	<i>First</i>
Wooptix	Gaudestad	Jan	<i>KLA</i>	<i>Perroots</i>	<i>Len</i>
<i>STA</i>	<i>Gupta</i>	<i>Dinesh</i>	<i>SOITEC</i>	<i>Pfeiffer</i>	<i>Gerd</i>
<i>KLA</i>	<i>Haller</i>	<i>Kurt</i>	<i>SMS</i>	<i>Poduje</i>	<i>Noel</i>
<i>SUMCO</i>	<i>Nakai</i>	<i>Tetsuya</i>	<i>Okmetic</i>	<i>Santala</i>	<i>Petri</i>
EV Group	Oakes	Garrett	<i>GlobalWafers</i>	<i>Takeda</i>	<i>Ryuji</i>
<i>Siltronic</i>	<i>Passek</i>	<i>Fritz</i>	<i>Self</i>	<i>Wagner</i>	<i>Peter</i>

Italic indicates remote participant. **Bold** indicates in person participant.

Table 2 Leadership Changes

<i>WG/TF/SC/TC Name</i>	<i>Previous Leader</i>	<i>New Leader</i>
None		

Table 3 Ballot Results

<i>Document #</i>	<i>Document Title</i>	<i>Committee Action</i>
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

<i>Document #</i>	<i>Document Title</i>	<i>ISC A&R Action</i>	<i>A&R Forms</i>
None			

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

<i>#</i>	<i>Type</i>	<i>SC/TF/WG</i>	<i>Details</i>
None			



Table 6 Authorized Activities

#	Type	SC/TF/WG	Details
7024	SNARF	Int'l Polished TF	Line Item Revision to SEMI M1-0918, Specification for Polished Single Crystal Silicon Wafers (Re: 300 mm tolerance)
7025	SNARF	Int'l Test Methods TF	Line Item Revision to SEMI MF1529-1110, Test Method for "Sheet Resistance Uniformity Evaluation by In-Line Four-Point Probe with the Dual-Configuration Procedure"

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
7025	Cycle 4, 5-2023	Int'l Test Methods TF	Line Item Revision of SEMI MF1529-1110: Test Method for "Sheet Resistance Uniformity Evaluation by In-Line Four-Point Probe with the Dual-Configuration Procedure"

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

#	TF	Title	Expiration Date
None			

Table 9 SNARF(s) Abolished

#	TF	Title
None		

Table 10 Standard(s) to receive Inactive Status

Standard Designation	Title
SEMI M74-1108 (Reapproved 1018)	Specification for 450 mm Diameter Mechanical Handling Polished Wafers

Table 11 New Action Items

Item #	Assigned to	Details
April2023-#1	Kevin Nguyen (SEMI Staff)	To provide the AWG TF the updated 5-year review list at the next meeting.
April2023-#2	Kevin Nguyen (SEMI Staff)	To contact ASML and ask them to come to the next meeting and present the markup version of M1 and justification for changing the tolerance of 300 mm wafer diameter.

Table 12 Previous Meeting Action Items

Item #	Assigned to	Details	Status
July2022-#1	Fritz Passek (Siltronic) and Len Perroots (KLA)	To provide proposals to SEMI on intercommittee cooperation with nonsilicon substrate	Completed
July2022-#w	Fritz Passek (Siltronic)	To provide Kevin the list of mercury related SEMI standards.	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.

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: By: Kurt Haller / KLA-Tencor
Second: Dinesh Gupta / Semiconductor Technology and Applications

Discussion: None

Vote: 8-0

3 Review of Schedule for the next meeting (SEMICON West, July 2023)

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, 2022
- Next meeting
 - TBD
 - Check www.semi.org/standards for latest update
- New SNARFs
- Authorized ballots
- Standard(s) to receive Inactive Status
 - SEMI M70-1015 - Test Method for Determining Wafer-Near-Edge Geometry Using Partial Wafer Site Flatness
- Int'l Advanced Wafer Geometry TF
 - Ballot Development
 - 6982, Revision to SEMI M78, Guide for Determining Nanotopography of Unpatterned Silicon Wafers for the 130 nm to 22 nm Generations in High Volume Manufacturing with title change to: Guide for Determining Nanotopography of Unpatterned Silicon Wafers in High Volume Manufacturing
 - 6983, Revision for SEMI M49, Guide for Specifying Geometry Measurement Systems for Silicon Wafers for the 130 nm to 16 nm Technology Generation
- Int'l Automated Advanced Surface Inspection TF
 - Presentation/Frank Laube

- Wafer manufacturers and device manufacturers to meet for defining SSIS tool requirements with respect to haze measurement
- Int'l Test Methods TF
 - Discussion of Hg replacement in SEMI MF1392 - Test Method for Determining Net Carrier Density Profiles in Silicon Wafers by Capacitance-Voltage Measurements with a Mercury Probe
 - Fritz reported the presentation held in March 27, 2023 can be included in the meeting minutes for information. Refer below.

Attachment: SEMI Non-Hg Epi-Res 27-Mar-2023

Attachment: EU Si Wafer TC Chapter Liaison Report Dec 2022 v1

4.2 *Japan TC Chapter*

4.2.1 Nakai-san reported for the Japan TC Chapter.

- Last meeting
 - Wednesday, December 14, 2022, in conjunction with SEMICON Japan 2022
 - Tokyo Big Sight, Tokyo, Japan + OVTCCM (Hybrid)
- Next meeting
 - Thursday, April 13, 2023
 - SEMI Japan Office, Tokyo, Japan + OVTCCM (Hybrid)
- Ballot Result
 - 6570A, New Standard: Guide for Measuring Bulk Micro Defect Density and Denuded Zone Width in Annealed Silicon Wafers by a Laser-Scatter Tomography Technique
 - Failed and returned to TF for rework
 - 6860, Revision of SEMI M41- 0615, Specification of Silicon-on-Insulator (SOI) for Power Device/ICs
 - Passed with editorial changes

Attachment: 202302_Silicon Wafer_JA_Liaison R

5 SEMI Staff Report

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

- SEMI upcoming event
 - SEMICON West, July 10-13, 2023
 - San Francisco, CA
- 2023 Critical Dates for SEMI Standards Ballots
 - <https://www.semi.org/en/collaborate/standards/ballots>
- Regulations and Procedure Manual Updates
 - Regulations (Feb 28, 2023)
 - Provide publication conditions for both Letter Ballot Review to pass procedural review and its Ratification Ballot is accepted.
 - If the Letter Ballot Review fails procedural review, the acceptance for the Ratification Ballot shall be nullified.



- <https://www.semi.org/sites/semi.org/files/2023-02/Standards%20Regulations%20February%2028%2C%202023.pdf>
- Procedure Manual (Feb 28, 2023)
 - Clarification on Line-Item Ballots are only permitted on revisions to already published identified portions of Standards or Safety Guidelines.
 - Revision of any Subordinate Standard causes the Publication Date Code of the Primary Standard to be considered as reapproved and it shall be given the (Reapproved mmyy) designation.
 - Contents of Background Statement Required for Revision of Subordinate/Primary Standard Letter Ballots.
 - <https://www.semi.org/sites/semi.org/files/2023-02/Procedure%20Manual%20February%2028%2C%202023.pdf>
 -
- SEMI University
 - More than 360 on-demand courses created specifically for the semiconductor industry
 - www.semi.org/en/semi-university
- SEMI Standards Publications
 - Total SEMI Standards in portfolio: 1,075
 - Includes 320 Inactive Standards

Attachment: Staff Report March 2023 v3

6 Regulations Change Report (if applicable)

6.1 Report was given in section 5, staff report.

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 development
 - M49 extension beyond 16nm Technology Generation
 - Lot of discussions on the draft essentially on three proposals:
 - Values in Table 4 constant from 16nm to 3nm TGs
 - Values in Table 4 increasing for 11 (or 10) nm to 3nm TGs
 - Both values in separate lines in Table 4
 - SFQR - no consensus yet
 - Peter Wagner: Made an attempt to get feedback from ASML, but no response.
 - Noel Poduje: Values based on IRDS, no input from the industry.

- Peter Wagner: If values are taken from IRDS, standards are just based on educated guess, not interest from the industry on such standard.
 - Kurt Haller: If the number is published in the table based on IRDS, from the equipment supplier's perspective, the values are reasonable.
 - Frit Passek: IC houses develop their own parameters. If each customer has a different number, then it would be difficult.
 - Kurt Haller: Reiterated that SEMI M49 is a Guide. It is up to the user and supplier's agreement.
 - Noel Poduje: How does Japan feels about this proposal? Noel recommended Japan to discuss with Yoshise.
 - Takeda-san: Will review and discuss with Japan via email.
 - It became clear that the goal of approving this document for ballot is not ready for cycle 4. However, Noel suggested to reconvene in the Working Group meeting to finalize the document, hopefully it is ready by cycle 5, which is in time for SEMICON West adjudication.
- Old Business
 - Advanced 200mm wafer requirements
 - No new discussion
 - Wafer requirements for EUV
 - No new discussion
 - 5-year review
 - EU Liaison report has 5 year review documents authorized for reapproval ballots. Some were also listed on this meeting's list.
 - **Action Item 1** - Kevin will compare and harmonize the new list.
 - Update of Legacy Test Methods
 - Deferred to a later meeting.
 - Geometry Standards for non-Si substrates
 - Noel asked Paul Trio what was being done. Paul said that there will be increased encouragement from Staff for different TCs and TFs in different regions to make each other aware of activity in this space. Noel said SEMI needs guidance and direction.
 - New Business
 - SNARF for M1 revision regarding 300mm wafer diameter tolerance
 - A SNARF request was submitted by ASML to Dinesh for the PW TF to revise M1 to decrease the 300mm wafer diameter tolerance from $\pm 200\mu\text{m}$ to $\pm 100\mu\text{m}$ "...for better lithography performance"
 - Noel recommended the SNARF to be approved.
 - Motion: Approve the SNARF
By: Kurt Haller / KLA-Tencor
Second: Dinesh Gupta / Semiconductor Technology and Applications
Discussion: Fritz Passek said Siltronic will support this proposal.
Result: 8-Y 0-N Voting Result: Pass - 100.00%.



- Noel recommended Kevin to contact ASML for a follow-up.
- **Action Item 2** – Kevin to contact ASML and ask them to come to the next meeting and present the markup version of M1 and justification for the changes.

Attachment: AWG NA Spring 2023

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

8.2.1 Kurt reported. Of note:

- SEMI Europe
 - The task force met at SEMICON Europa in November 2022 for the first time since the COVID pandemic. A total of 5 ballot documents were recommended for approval by the Si Wfr TC, meeting the next day, which they received.
 - Ballots will be released for voting in 2023, cycles 4 and 5, and adjudicated at SEMICON West in July.
- Si Wafer Surface Microroughness Workshop.
 - The teleconference was held 15 Mar 2023 with 22 participants from Europe, North America, and Japan. Kurt briefly reviewed the workshop presentations from Park Systems (AFM equipment supplier), KLA (SSIS equipment supplier), and a joint presentation from Siltronic AG and Global wafers. The complete workshop proceedings may be downloaded from <https://connect.semi.org>
 - Two on-going working groups were proposed by the workshop: the first to develop ideas for the scope and content of a potential, prescriptive SEMI Standard for AFM measurement of prime Si wafer surface roughness; the second to identify the most nearly optimal configuration for haze

Attachment: IAASI_Minutes_SEMI_NA_Spring_2023

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

8.3.1 Gerd reported. Of note:

- Doc. 6860, Revision of SEMI M41- 0615, Specification of Silicon-on-Insulator (SOI) for Power Device/IC, was approved in December 2022 meeting in Japan, and it is currently being processed for publication.
- The TF will work 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:

- The following documents provided in the Excel lists are due for 5 year review. These should go out for cycle 4 and 5-2023. However, they are not reviewed yet. Noel suggested to bring this up at the next Japan meeting which is coming up in a few days. Dinesh will review and forward the list to Japan for help.
- Dinesh presented a SNARF for revision of MF1529 to restore a missing negative sign on equation 8.
- Motion: Approve the SNARF for Line Item Revision of MF1529
By: Dinesh Gupta / Semiconductor Technology and Applications
Second: Kurt Haller / KLA-Tencor
Discussion:
Result: 7-Y 0-N Voting Result: Pass - 100.00%.



- Motion: Authorize the document for line item revision of MF1529 for cycle 4 for review in San Francisco meeting
By: Dinesh Gupta / Semiconductor Technology and Applications
Second: Kurt Haller / KLA-Tencor
Discussion:
Result: 7-Y 0-N Voting Result: Pass - 100.00%.

Attachment: Min Test Methods Mtg 040323

Attachment: SNARF MF1529-1110 to Correct 13.2 (Eq. 8) 040323

Attachment: Documents for 5 years Review 040323

8.5 *Int'l Polished Wafer TF/TBD*

8.5.1 Dinesh said a TF leader is needed. He would like someone representing from the wafer manufacturer and that person does not need to reside in the USA. Fritz Passek will communicate with Frank. Dinesh will also bring this up at the SMG meeting during SEMICON West.

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 11, 2023 in San Francisco, CA. Refer <http://www.semi.org/standards> for the current list of meeting schedules.

11.2 Having no further business, a motion was made to adjourn. Adjournment was at 11:30 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

<i>Title</i>	<i>Title</i>
Wafer West 2023 schedule	AWG NA Spring 2023
SEMI Non-Hg Epi-Res 27-Mar-2023	IAASI_Minutes_SEMI_NA_Spring_2023
EU Si Wafer TC Chapter Liaison Report Dec 2022 v1	Min Test Methods Mtg 040323
202302_Silicon Wafer_JA_Liaison R	SNARF MF1529-1110 to Correct 13.2 (Eq. 8) 040323
Staff Report March 2023 v3	Documents for 5 years Review 040323

#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.