Silicon Wafer NA TC Chapter
Meeting Summary and Minutes

SEMICON West Meetings
Tuesday, July 12, 2022
9:00 AM – 11:30 AM
Moscone Center, San Francisco, CA

TC Chapter Announcements

Next TC Chapter Meeting
Tuesday, April 4, 2023, Milpitas, CA in conjunction with NA Spring 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*
Wooptix	**Gaudestad**	**Jan**	**KLA**	**Perroots**	**Len**
STA	**Gupta**	**Dinesh**	**SOITEC**	**Pfeiffer**	**Gerd**
KLA	**Haller**	**Kurt**	*SMS*	*Poduje*	*Noel*
Nordson SONOSCAN	**Martell**	**Steve**	*GlobalWafers*	*Ruprecht*	*David*
SUMCO	*Nakai*	*Tetsuya*	**Okmetic**	**Santala**	**Petri**
Siltronic	**Passek**	**Fritz**	*Self*	*Wagner*	*Peter*

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 Activities Approved by the GCS between meetings of the TC Chapter

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

Table 5 Authorized Activities

#	*Type*	*SC/TF/WG*	*Details*
6955	SNARF	Int'l ASI TF	Line Item Revision of SEMI M40 - Guide for Measurement of Roughness of Planar Surfaces on Polished Wafers
6956	SNARF	Int'l ASI TF	Line Item Revision of SEMI ME1392 - Guide for Angle Resolved Optical Scatter Measurements on Specular or Diffuse Surfaces
6957	SNARF	Int'l ASI TF	Line Item Revision of SEMI M52 - Guide for Specifying Scanning Surface Inspection Systems for Silicon Wafers for the 130 nm to 5 nm Technology Generations
6958	SNARF	Int'l Test Methods TF	Reapproval of SEMI M21 - Guide for Assigning Addresses to Rectangular Elements in a Cartesian Array
6959	SNARF	Int'l Test Methods TF	Reapproval of SEMI MF1763 - Test Method for Measuring Contrast of a Linear Polarizer

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

Table 6 Authorized Ballots

#	*When*	*SC/TF/WG*	*Details*
6824	Cycle 6, 7 or 8-2022	Int'l ASI TF	Line Item Revision of SEMI MF1048-0217 Test Method For Measuring Reflective Total Integrated Scatter
6955	Cycle 6, 7 or 8-2022	Int'l ASI TF	Line Item Revision of SEMI M40 - Guide for Measurement of Roughness of Planar Surfaces on Polished Wafers
6956	Cycle 6, 7 or 8-2022	Int'l ASI TF	Line Item Revision of SEMI ME1392 - Guide for Angle Resolved Optical Scatter Measurements on Specular or Diffuse Surfaces
6957	Cycle 6, 7 or 8-2022	Int'l ASI TF	Line Item Revision of SEMI M52 - Guide for Specifying Scanning Surface Inspection Systems for Silicon Wafers for the 130 nm to 5 nm Technology Generations
6958	Cycle 6, 7 or 8-2022	Int'l Test Methods TF	Reapproval of SEMI M21 - Guide for Assigning Addresses to Rectangular Elements in a Cartesian Array
6959	Cycle 6, 7 or 8-2022	Int'l Test Methods TF	Reapproval of SEMI MF1763 - Test Method for Measuring Contrast of a Linear Polarizer
6824	Cycle 6, 7 or 8-2022	Int'l ASI TF	Line Item Revision of SEMI MF1048-0217 Test Method For Measuring Reflective Total Integrated Scatter

Table 7 SNARF(s) Granted a One-Year Extension

#	*TF*	*Title*	*Expiration Date*
6853	Int'l SOI TF	New Standard: Specification for SOI Wafers for RF Device Applications	9/6/2023

Table 8 SNARF(s) Abolished

#	*TF*	*Title*
None		

Table 9 Standard(s) to receive Inactive Status

Standard Designation	*Title*
None	

Table 10 New Action Items

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

Table 11 Previous Meeting Action Items

Item #	*Assigned to*	*Details*	*Status*
March2022-#1	Fritz Passek (Siltronic)	To bring up mercury issue (where it is banned by the EU Regulations) in the Int'l Test Methods TF for solution.	Completed

1 Welcome, Reminders, and Introductions

1.1 Dinesh Gupta 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: Friedrich Passek / Siltronic AG
Second: Jan Gaudestad / Wooptix S.L.
Discussion: None
Vote: 7-0

3 Review of Schedule for the next meeting (Spring, April 2023)

3.1 Draft schedule is attached.

Attachment: Sch SiWfr 0423 Tentative

4 Liaison Reports

4.1 *Europe TC Chapter*

4.1.1 No meeting.

4.2 *Japan TC Chapter*

4.2.1 Nakai-san reported for the Japan TC Chapter.

- Last meeting
  - May 22, 2022 at the SEMI Standards Japan Winter Meetings
- Next meeting

  - August 25, 2022 at the SEMI Standards Japan Summer Meetings
- Ballot Result
  - 6570, 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
- Japan Test Method Task Force
  - Ballot Development
    - 5772, Revision of MF391 Test Methods for Minority Carrier Diffusion Length in Extrinsic Semiconductors by Measurement of Steady-state Surface photovoltage
    - 6702, Revision of M60 Test Method for Time Dependent Dielectric Breakdown Characteristics of SiO2 Films for Si Wafer Evaluation
    - 6687, Revision of M51 Test Method for Characterizing Silicon Wafer by Gate Oxide Integrity
- Discussion:
  - Dinesh Gupta – SEMI M62-0317 - Specification for Silicon Epitaxial Wafers is due for 5 year review. Who is in charge of Japan? We may want consult for review.
  - Tetsuya Nakai – The leader is Toda-san from S.E.H.
  - Peter Wagner suggested to issue for reapproval ballot.
  - Per Dinesh Gupta, M62 is a huge document, thus a thorough review is needed before issuing for reapproval ballot.
  - On a separate issue, Noel Poduje said all reapproval ballots should not go out automatically until the M59/COT issue is looked at. At the very least, the reference to SEMI M59 should be checked.

Attachment: **202206_SiliconWafer-Japan_LiaisonR_v1.0**

4.3 *GCS*

4.3.1 Dinesh Gupta provided GCS report. Of note:

- Need for Standardization for Geometry Measurements on Non-Silicon Substrates – will be further discussed in AWG TF meeting.
- Status of M59 – Ref. in Documents
  - Noel Poduje stated M59 reference should be deferred to each task force when a standard is due for 5 year review and it should be taken care of routinely.

Attachment: Agenda & Minutes GCS NA Mtg 071122

5 SEMI Staff Report

5.1 Kevin Nguyen (SEMI) reported.

- SEMI upcoming event
  - 2022 Calendar of Events
  - Upcoming NA Meetings
    - NA Standards Fall Meetings
      - Nov 7-10, 2022

- SEMI HQ in Milpitas, California
- 2022 Critical Dates for SEMI Standards Ballots
    - https://www.semi.org/en/collaborate/standards/ballots
- SEMI Standards Publications
    - Total SEMI Standards in portfolio: 1,064
        - Includes 320 Inactive Standards
- NEW! SEMI Corporate PPT Template
    - SEMI launched a new corporate PPT template earlier this year
        - Standards is among the first to use the new template ☆
    - We encourage TFs to begin transitioning over to the new template
        - Please reach out to your Staff contact for assistance
        - Templates will be sent out by Staff and can be found on the SEMI Web site

Attachment: Staff Report July 2022 v7

6 Regulations Change Report (if applicable)

6.1 Report was given in the last meeting in Spring 2022. No new 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:

- Presentation
    - None
- Ballot review
    - Doc. 6767 from China Compound Semiconductor TC, TEST METHOD FOR FLATNESS OF SILICON CARBIDE WAFERS BY OPTICAL INTERFERENCE.
    - This ballot, among others, failed for various reasons having received many negatives and comments. It is back in Task Force.
    - Yoshi attended various meetings remotely but was largely unable to follow and participate in the discussions due to lack of effective translation from the Chinese.
    - The issue of which Committee / TF in SEMI Standards should deal with no-SI substrate geometry was raised. Among others, Fritz said that the manufacturers of geometry tool should inform users of the suitability of their tools for non-Si relative to current Standards and bring these issues to AWG as necessary.
- Old Business
    - M49 extension beyond 16nm TN
        - Yoshi presented a very detailed proposal for extending performance guidance in M49 beyond the 16nm node.

  - The proposal reflects the IRDS guidance for upcoming "technology nodes" although their names now correspond less to actual device dimensions.
  - A lively discussion ensued regarding what to do with M49. Among other opinions:
    1. Stop updating it;
    2. Update it but do not rely on it as a predictor of the future, requirements are much more proprietary, etc. We will continue to discuss. Everyone was encouraged to try to digest Yoshi's proposal, discuss it by email and expect more interesting discussion at the next meeting
- Advanced 200mm wafer requirements
  - No new discussion
- Wafer requirements for EUV
  - No new discussion

- 5-year review
  - SEMI MF1390-0218 Test Method for Measuring Bow and Warp on Silicon Wafers by Automated Noncontact Scanning
  - SEMI M78-0618 Guide for Determining Nanotopography of Unpatterned Silicon Wafers for the 130 nm to 22 nm Generations in High Volume Manufacturing
  - SEMI M43-0418 Guide for Reporting Wafer Nanotopography
  - These are deferred to a later meeting.
- Update of Legacy Test Methods
  - Deferred to a later meeting.
- Geometry Standards for non-Si substrates
  - The TF will ask SEMI to organize some sort of joint discussion among the Regions and among SI and Compound Committees and TF's. The goal is to promote cooperation and facilitate discussion about a topic that crosses geographic and material technology boundaries. Fritz encouraged a return to the precompetitive approach liked with I300I.
    - Len Perroots also echoed similar sentiment. He is seeing silicon carbide requirement. The joint collaboration will not take place unless SEMI provides such forum. He realizes the current geopolitical issue, but everyone should stick to the basic foundation of SEMI where everyone collaborates and find better ways to help industry in general.
    - Fritz Passek also said in a high level concept, there should be 3 proposals:
      1. A joint meeting and discussion of worldwide silicon carbide requirements
      2. Along term initiative that brings together the China, Japan, European, US, SIC/compound standards committees, much as i300i sponsored that joint development standards effort.
      3. Modify SNARF form by adding the request to check availability of existing Standards dealing with the same or similar topics.
  - **Action Item 1** - Len and Fritz will carry the request to SEMI Staff.

Attachment: **AWG NA SEMICON W 2022**

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

8.2.1 Kurt reported. Of note:

8.2.2 Ballot development

- Doc #6824: SEMI MF1048-0217 revision: Test Method for Measuring Reflective Total Integrated Scatter
  - Noel commented that a mechanism to reinsert M59 terms into the primary standards documents from whence they originally came is needed. Such a mechanism will be tricky, because M59 does NOT cite the original sources of the terms it contains. What's more, while the CoT does cite the standards in which a term appears, many of its terms' citations point to M59!
  - Kurt opined that returning every definition in M59 to its rightful place in a primary standard document, and that the CoT properly cites the defining standards, is a very large clerical elephant that must be eaten one bite at a time. The TF agreed the proposed changes to MF1048 were nonetheless worth presenting to the TC, while plans to tackle the rest of the elephant emerge in the fullness of time.
  - Motion: Authorize doc. 6824 for Letter Ballot of MF1048
    By: Kurt Haller / KLA-Tencor
    Second: Friedrich Passek / Siltronic AG
    Discussion:
    Result: 7-Y 0-N Voting Result: Pass - 100.00%
- Doc #tbd: SEMI M40-1114 5-yr review: Guide for Measurement of Roughness of Planar Surfaces on Polished Wafers
  - Motion: Approve the SNARF Line item revision of SEMI M40-1114
    By: Kurt Haller / KLA-Tencor
    Second: Friedrich Passek / Siltronic AG
    Discussion:
    Result: 9-Y 0-N Voting Result: Pass - 100.00%
  - Motion: Authorize the Document for Letter Ballot for Line item revision of SEMI M40-1114 in cycle 6
    By: Kurt Haller / KLA-Tencor
    Second: Friedrich Passek / Siltronic AG
    Discussion:
    Result: 9-Y 0-N Voting Result: Pass - 100.00%
- Doc #tbd: ME1392-0116 5-yr review: Guide for Angle Resolved Optical Scatter Measurements on Specular or Diffuse Surfaces
  - Motion: Approve the SNARF for SEMI ME1392-0116
    By: Kurt Haller / KLA-Tencor
    Second: Friedrich Passek / Siltronic AG
    Discussion:
    Result: 9-Y 0-N Voting Result: Pass - 100.00%
  - Motion: Authorize the Document for Letter Ballot Line item revision of SEMI ME1392-0116 for cycle 6
    By: Kurt Haller / KLA-Tencor
    Second: Friedrich Passek / Siltronic AG
    Discussion:
    Result: 9-Y 0-N Voting Result: Pass - 100.00%
- Doc #tbd: M52-0621 line item revision: Guide for Specifying Scanning Surface Inspection Systems for Silicon Wafers for the 130 to 5 nm Technology Generations
  - Motion: Approve the SNARF for M52-0621 line item revision
    By: Kurt Haller / KLA-Tencor
    Second: Jan Gaudestad / Wooptix S.L.
    Discussion:
    Result: 9-Y 0-N Voting Result: Pass - 100.00%
  - Motion: Authorize the Document for Letter Ballot for M52-0621 line item revision as drafted
    By: Kurt Haller / KLA-Tencor
    Second: Steve Martell / Nordson SONOSCAN

Discussion:
Result: 8-Y 0-N Voting Result: Pass - 100.00%

- Doc# tbd: M50-1116 5-yr review: Test Method for Determining Capture Rate and False Count Rate for Surface Scanning Inspection Systems by the Overlay Method
  - Fritz affirmed Dr. Frank Laube and the European IAASI will lead the review. The Europe Silicon Wafer Technical Committee expects to meet in November 2022 to take up the matter.

8.2.3 Presentations

- Fritz briefly outlined a presentation regarding haze reference standard wafers that had to be postponed until the European TF meeting planned for November: IC makers working on the most advanced technology nodes are indeed requiring increasingly tighter surface roughness requirements on prime device wafer surfaces. The use of SSIS haze as a quantitative, repeatable, and matchable metric is technically challenging for reasons related both to SSIS equipment as well as the manufacturing of reference calibration standards themselves.

Attachment: IAASI_West_11_Jul_2022_corrected

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

8.3.1 Gerd reported. Of note:

- The TF has been meeting and working on doc. 6860, Revision of SEMI M41- 0615, Specification of Silicon-on-Insulator (SOI) for Power Device/IC. The document is ready for issuing for ballot.
- Tetsuya Nakai asked if the draft has been distributed to Japan SOI TF members for review.
- Gerd plans to email to Nakai-san, so he can help distributing to Japan members for further review.
- On a separate topic, Kevin Nguyen noted that Doc. 6583, New Standard: Specification for SOI Wafers for RF Device Applications, has reached 3 year project limitation. The TF needs TC Chapter's permission for 1 year project extension.
  - Motion: Approve a 1 year extension of the project period for the SNARF for Doc. 6583
    By: Gerd Pfeiffer / Soitec
    Second: Steve Martell / Nordson SONOSCAN
    Discussion:
    Result: 8-Y 0-N Voting Result: Pass - 100.00%

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

8.4.1 Dinesh reported. Of note:

- The following documents are due for 5 year review.
  - SEMI MF26 Determining the orientation of a semi-conductive single crystal
  - SEMI MF1982 Analyzing organic contaminants on silicon wafer surfaces by thermal desorption gas chromatography
  - SEMI MF1391 Substitutional atomic carbon content of silicon by infrared absorption
  - SEMI MF1763 Measuring contrast of a linear polarizer
  - SEMI M21 Guide for assigning addresses to rectangular elements in a Cartesian array
- MF26, MF1982, MF1391 need further review. However, MF1763 and M21 can be issued for reapproval.

- Motion: Authorize Letter Ballot for reapproval of MF1763 and MF21 as is
  By: Kurt Haller / KLA-Tencor
  Second: Petri Santala / Okmetic
  Discussion:
  Result: 8-Y 0-N Voting Result: Pass - 100.00%

Attachment: **Min Test Methods Mtg 071122**

9 Old Business

9.1 Mercury issue

9.1.1 Fritz Passek reported mercury (hg) is banned by the EU Regulations. He has concern that several test method standards using mercury probe for measurement.

9.1.2 Dinesh said he can go through the Test Method standards. Noel Poduje said no action should be taken now, but rather have Fritz to provide the list of impacted standards for further discussion at the next Test Methods TF meeting. **Action Item 2** – Fritz to provide Kevin the list of mercury related standards.

9.1.3 Fritz sent Kevin the list of the following mercury related standards.

- SEMI D35-1103 (Reapproved 0709) TEST METHOD FOR MEASUREMENT OF COLD CATHODE FLUORESCENT LAMP (CCFL) CHARACTERISTICS
- SEMI D36-0306 TERMINOLOGY FOR LCD BACKLIGHT UNIT
- SEMI M42-1000 SPECIFICATION FOR COMPOUND SEMICONDUCTOR EPITAXIAL WAFERS
- SEMI M62-0309 SPECIFICATIONS FOR SILICON EPITAXIAL WAFERS
- SEMI MF110-1107 TEST METHOD FOR THICKNESS OF EPITAXIAL OR DIFFUSED LAYERS IN SILICON BY THE ANGLE LAPPING AND STAINING TECHNIQUE
- SEMI MF1392-0307 TEST METHOD FOR DETERMINING NET CARRIER DENSITY PROFILES IN SILICON WAFERS BY CAPACITANCE-VOLTAGE MEASUREMENTS WITH A **MERCURY PROBE**
- SEMI MF1527-0307 GUIDE FOR APPLICATION OF CERTIFIED REFERENCE MATERIALS AND REFERENCE WAFERS FOR CALIBRATION AND CONTROL OF INSTRUMENTS FOR MEASURING RESISTIVITY OF SILICON
- SEMI MF1618-1104 PRACTICE FOR DETERMINATION OF UNIFORMITY OF THIN FILMS ON SILICON WAFERS
- SEMI MF1771-0304 TEST METHOD FOR EVALUATING GATE OXIDE INTEGRITY BY VOLTAGE RAMP TECHNIQUE

10 New Business

10.1 Intercommittee cooperation with nonsilicon substrate

10.1.1 Fritz Passek sent these proposals to Kevin. Refer below. Noel suggested Kevin to take this up to SEMI for further actions.

Proposal one:
AWG suggests that SEMI recommend/sponsor a joint meeting and discussion of worldwide silicon carbide and other non-Si substrates requirements and the value going forward of M49, in particular in regard to compound materials/silicon carbide geometry standards and recommendations.

Proposal two:

That SEMI standards drives a long term initiative that brings together the China, Japan, European, US, SIC/compound standards committees, much as i300i sponsored that joint development standards effort. It is critical that SEMI Standards recaptures its role in the industry of driving truly international standards that benefit the whole food chain by minimizing duplicate design efforts and cutting manufacturing costs, etc.

Proposal three:

Modify SNARF form by adding the request to check availability of existing Standards dealing with the same or similar topics but worked out by another TF or for other applications.

10.2 Publication backlog and member issue.

10.2.1 Dinesh Gupta reported during the NARSC meeting there is a issue in SEMI publication. Some documents are approved by the TC Chapter, but there is delay in processing for publication. There are discussions on how to improve the ballot quality to reduce backlog.

10.2.2 Also, the NARSC discussed member etiquette. The goal is for standards members to communicate within the task force and submit comment in the meeting rather than later after the ballot is issued. There is a possibility that additional guidelines will be added to the meeting required elements slides. Nothing is official yet. More will be reported at the next NARSC meeting.

11 Next Meeting and Adjournment

11.1 The next meeting is scheduled for April 4, 2023 at SEMI HQ in Milpitas, 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 12 Index of Available Attachments[#1]

Title	*Title*
Sch SiWfr 0423 Tentative	AWG NA SEMICON W 2022
202206_SiliconWafer-Japan_LiaisonR_v1.0	IAASI_West_11_Jul_2022_corrected
Agenda & Minutes GCS NA Mtg 071122	Min Test Methods Mtg 071122
Staff Report July 2022 v7	

#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.