Silicon Wafer NA TC Chapter
Meeting Summary and Minutes
SEMICON West
Tuesday, July 12, 2016, 9:00 AM - 12:00 Noon
San Francisco Marriott Marquis, San Francisco, California

TC Chapter Announcements

Next TC Chapter Meeting
Tuesday, April 4, 2016 (9:00 AM-Noon) San Jose, CA in conjunction with the NA Spring Standards Meeting 2017.
Check www.semi.org/en/standards for the latest update.

Table 1 Meeting Attendees

Italics indicate virtual participants

Co-Chairs: Dinesh Gupta (STA)

SEMI Staff: Kevin Nguyen (SEMI HQ)

Company	*Last*	*First*	*Company*	*Last*	*First*
Materials & Metrology	*Bullies*	*Murray*	Siltronic	Passek	Fritz
Self	Goldstein	Mike	SUMCO	Nakai	Tetsuya
KLA-Tencor	Haller	Kurt	Self	Yoshise	Masanori
SMS	*Poduje*	*Noel*	Self	Sinha	Jaydeep
SSL	*Valley*	*John*	Suny Polytechnic	Christal	Lorn
Self	Wagner	Peter	Hitachi High Tech	Ikota	Masami

Table 2 Task Force or Leadership Changes

Group	*Previous Leader*	*New Leader*
Silicon Wafer TC Chapter Technical Editor	Murray Bullis stepped down.	
Int'l Polished Wafer Task Force	Mike Golstein stepped down.	
Int'l SOI Task Force	Bich-Yen Nguyen (SOITEC)	Gerd Pfeiffer (GlobalFoundries)

Table 3 Ballot Results

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

Document #	*Document Title*	*Committee Action*
5744A	Line Item Revision to SEMI M49-0613 - Guide for Specifying Geometry Measurement Systems for Silicon Wafers for the 130 nm to 16 nm Technology Generations	
	Line Item 1 - To clarify and better define exclusion windows)	Passed as balloted
5737A	Revision of SEMI MF1391-1107, Test Method for Substitutional Atomic Carbon Content of Silicon by Infrared Absorption	Failed and returned to TF for rework and reballot
5989	Revision of SEMI M62-0515, Specifications for Silicon Epitaxial Wafers	Passed superclean
5990	Revision of SEMI MF1811-0116 Guide For Estimating The Power Spectral Density Function And Related Finish Parameters From Surface Profile Data	Passed superclean
5994	Line Item Revision to SEMI M50, Test Methods for Determining Capture Rate and False Count Rate for Surface Scanning Inspection Systems by the Overlay Method	
	Line Item 1 - Fix title for conformance	Passed superclean
5993	Line Item Revision of SEMI M1-0416, Specification for Polished Single Crystal Silicon Wafers	
	Line Item 1 - Clarify the heading and intent of section 7	
6019	Line item Revision of SEMI M1-0416, Specification for Polished Single Crystal Silicon Wafers	
	Line Item 1 -Correct and update Figure 3.	Passed superclean
	Line Item 2 -Remove redundant notes from the caption of Figure 7, and delete the term “outer” before “FQA boundary.”	Passed as balloted
	Line Item 3 -Point out in ¶R3-4.4 that minority carrier lifetime measurements in electronic silicon manufacture must be controlled by recombination at impurities.	Passed as balloted
	Line Item 4 -Add “and bow” to Note 13.	Failed and returned to TF for rework and reballot
	Line Item 5 -Add “and 450” to ¶R3-9.5 and correct the reference to ¶R3-9.4.	Passed as balloted

Table 4 Authorized Activities

#	*Type*	*SC/TF/WG*	*Details*
5915	SNARF	Int'l Advanced Wafer Geometry TF	Line Item Revision to SEMI M1-0215, Addition to Related Information: Illustration of Flatness and Shape Metrics for Silicon Wafers (SNARF was revised)
6041	SNARF	Int'l Advanced Wafer Geometry TF	Line Item Revision to M21-1110 Guide For Assigning Addresses To Rectangular Elements In A Cartesian Array
6042	SNARF	Int'l Test Methods TF	Line Item Revision to SEMI MF1763-0706 (Reapproved 1111)Test Methods for Measuring Contrast of a Linear Polarizer (Title correction for conformance)

#	Type	SC/TF/WG	Details
6043	SNARF	Int'l Test Methods TF	Line Item Revision to SEMI MF28-0707 (Reapproved 0912) Test Methods for Minority Carrier Lifetime in Bulk Germanium and Silicon by Measurement of Photoconductivity Decay (Title correction for conformance)
6044	SNARF	Int'l Test Methods TF	Line Item Revision to SEMI MF673-1014 Test Methods For Measuring Resistivity Of Semiconductor Wafers Or Sheet Resistance Of Semiconductor Films With A Noncontact Eddy-current Gauge (Title correction for conformance)
6045	SNARF	Int'l Test Methods TF	Line Item Revision to SEMI MF928-1014 Test Methods For Edge Contour Of Circular Semiconductor Wafers And Rigid Disk Substrates (Title correction for conformance)
6046	SNARF	Int'l Test Methods TF	Line Item Revision to SEMI MF1982-0714 Test Methods For Analyzing Organic Contaminants On Silicon Wafer Surfaces By Thermal Desorption Gas Chromatography (Title correction for conformance)
6047	SNARF	Int'l Test Methods TF	Reapproval of SEMI MF728-1106 (Reapproved 1111) Practice for Preparing an Optical Microscope for Dimensional Measurements
6048	SNARF	Int'l Test Methods TF	Reapproval of SEMI MF978-1106 (Reapproved 1111)Test Method for Characterizing Semiconductor Deep Levels by Transient Capacitance Techniques

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

Table 5 Authorized Ballots

#	When	SC/TF/WG	Details
5995	Cycle 6-15	Int'l Automated Advance Surface Inspection T	Line Item Revision of SEMI MF1048-1111 TEST METHOD FOR MEASURING REFLECTIVE TOTAL INTEGRATED SCATTER
6042	Cycle 6-15	Int'l Test Methods TF	Line Item Revision to SEMI MF1763-0706 (Reapproved 1111)Test Methods for Measuring Contrast of a Linear Polarizer (Title correction for conformance)
6043	Cycle 6-15	Int'l Test Methods TF	Line Item Revision to SEMI MF28-0707 (Reapproved 0912) Test Methods for Minority Carrier Lifetime in Bulk Germanium and Silicon by Measurement of Photoconductivity Decay (Title correction for conformance)
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6046	Cycle 6-15	Int'l Test Methods TF	Line Item Revision to SEMI MF1982-0714 Test Methods For Analyzing Organic Contaminants On Silicon Wafer Surfaces By Thermal Desorption Gas Chromatography (Title correction for conformance)
6047	Cycle 6-15	Int'l Test Methods TF	Reapproval of SEMI MF728-1106 (Reapproved 1111) Practice for Preparing an Optical Microscope for Dimensional Measurements
6048	Cycle 6-15	Int'l Test Methods TF	Reapproval of SEMI MF978-1106 (Reapproved 1111)Test Method for Characterizing Semiconductor Deep Levels by Transient Capacitance Techniques

Table 6 New Action Items

Item #	*Assigned to*	*Details*
July122016-#1	Kevin Nguyen (SEMI Staff)	To send a list of ballots to be reviewed at SEMICON Europa 2016 to Peter Wagner and Fritz Passek

Table 7 Previous Meeting Action Items

None

1 Welcome, Reminders, and Introductions

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 Schedule for the next meeting (NA Spring, April 3-4, 2017)

Dinesh Gupta showed the draft Spring 2017 schedule.

Attachment: Sch SiWfr 0417

3 Review of Previous Meeting Minutes

The TC Chapter reviewed the minutes of the previous meeting.

Motion: Accept the minutes as written
By / 2nd: Masanori Yoshise/Tetsuya Nakai
Discussion: None
Vote: 7-0

4 Liaison Reports

4.1 *Silicon Wafer Europe TC Chapter*

There was no meeting since Oct 2015. No new update. Although Kevin Nguyen showed the preliminary schedule for the upcoming meeting in Grenoble, France.

Attachment: SCEU2016_StandardsSchedule V1 20160711r2

4.2 *Silicon Wafer Japan TC Chapter*

Tetsuya Nakai reported. Of note:

- JEITA/JSNM
  - Japan Society of Newer Metals (JSNM) takes over the functionality of the Committee, including management related to JIS standards based on JEITA standards
- JAIDA/JEITA Standards documents
  - are archived and can be accessed on the JEITA website (http://www.jeita-smtj.com/jp/index_silicon.htm) until 2026/03 from now on.
  - JSNM also started to post those documents with selected reports from old JEITA silicon technology committee.

- JSNM Material Standards Study Group for Semiconductor Supply-Chain(M4S) is established on April 1, 2016 to take over JETTA Silicon Wafer Technology Committee.
  - develops JSNM semiconductor related standards
  - will have good relation with SEMI
  - Liaison member from SEMI: Masayoshi Yoshise.
- Japan Test Method Task Force
  - Drafting: NEW STANDARD: Test method for nitrogen content in silicon by charged particle activation analysis

Attachment: 2016.07.12 Silicon Wafer Japan_N_R1.0

4.3 *SEMI Staff Report*

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

- Next meetings
  - November 7-10, 2016
    - SEMI HQ in San Jose, California
  - April 3-6, 2017
    - SEMI HQ in San Jose, California
  - July 10-13, 2017
    - San Francisco, California
- 2016 Critical Dates for SEMI Standards Ballots
  - Cycle 6
    - Ballot submission deadline: July 22
    - Voting opens: August 1
    - Voting closes: Sept 1
  - Cycle 7
    - Ballot submission deadline: Aug 17
    - Voting opens: August 31
    - Voting closes: Sept 30
    -
- SEMI Standards Publications
  - Total SEMI Standards in portfolio: 964
    - Includes 141 Inactive Standards

Attachment: Staff Report June 2016 Wafer

5 Regulations Change Report (if applicable)

No new Regulations.

6 Ballot Review

Passed ballots and line items will be submitted to the ISC Audit & Review Subcommittee for procedural review.

Failed ballots and line items were returned to the originating task forces for re-work and re-balloting.

NOTE 2: TC Chapter adjudication on ballots reviewed is detailed in the Audits & Review (A&R) Subcommittee Forms for procedural review. The A&R forms are available as attachments to these minutes. The attachment number for each balloted document is provided under each ballot review section below.

6.1 Cycle 3-2016

6.1.1 Doc. 5744A, Line Item Revision to SEMI M49-0613 - Guide for Specifying Geometry Measurement Systems for Silicon Wafers for the 130 nm to 16 nm Technology Generations (Re: to clarify and better define exclusion windows)

6.1.1.1 It passed as balloted.

Attachment: 5744A Procedural Review

6.2 Cycle 4-2016

6.2.1 Doc. 5737A, Revision of SEMI MF1391-1107, Test Method for Substitutional Atomic Carbon Content of Silicon by Infrared Absorption

6.2.1.1 Balloted failed and returned to task force.

Attachment: 5737A Procedural Review

6.2.2 Doc. 5989, Revision of SEMI M62-0515, Specifications for Silicon Epitaxial Wafers

6.2.2.1 It passed as balloted.

Attachment: 5989 Procedural Review

6.2.3 Doc. 5990, Revision of SEMI MF1811-0116 Guide For Estimating The Power Spectral Density Function And Related Finish Parameters From Surface Profile Data

6.2.3.1 It passed as balloted.

Attachment: 5990 Procedural Review

6.2.4 Doc. 5994, Line Item Revision to SEMI M50, Test Methods for Determining Capture Rate and False Count Rate for Surface Scanning Inspection Systems by the Overlay Method (Fix title for conformance)

6.2.4.1 It passed as balloted.

Attachment: 5994 Procedural Review

6.3 Cycle 5-2016

6.3.1 Doc. 5993, Line Item Revision of SEMI M1-0416, Specification for Polished Single Crystal Silicon Wafers

6.3.1.1 It passed as balloted.

Attachment: 5993 Procedural Review

6.3.2 Doc. 6019, Line item revision of SEMI M1-0416, Specification for Polished Single Crystal Silicon Wafers

6.3.2.1 Line item 1, 2, 3, and 5 passed as balloted. Line item 4 failed and was returned to task force for reballot.

Attachment: 6019 Procedural Review

7 Subcommittee and Task Force Reports

7.1 Int'l Advanced Wafer Geometry Task Force /Noel Poduje (SMS), Jaydeep Sinha

Jaydeep Sinha reported. Of note:

- Ballot development.
  - Doc. 5915, Line Item Revision to SEMI M1. There were some discrepancies in the charter and scopte of the SNARF. Tetsuya Nakai presented revision to doc. 5915 SNARF.

Motion: To approve revision of SNARF 5915
By / 2nd: Jaydeep Sinha/Tetsuya Nakai
Discussion: None
Vote: 8-0

Attachment: Doc.5915_M1 Line Item Revision_r3

- M21, M43, and M78 are under 5 year review.
  - SNARF - line Item revision of M21-1110 GUIDE FOR ASSIGNING ADDRESSES TO RECTANGULAR ELEMENTS IN A CARTESIAN ARRAY, was presented.

Motion: To approve revision of SNARF M21
By / 2nd: Jaydeep Sinha/Kurt Haller
Discussion: None
Vote: 8-0

Attachment: awgmaterials.zip

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

Kurt Haller presented report. Of Note:

- Ballot development
  - Doc #5995, 5-year review of SEMI MF1048-1111 Test Method for Measuring Reflective Total Integrated Scatter, is ready for Letter ballot.

Motion: To authorize doc. 5995 for cycle 6 for review at SEMICON Europa
By / 2nd: Jaydeep Sinha/Kurt Haller
Discussion: None
Vote: 8-0

- Presentation
  - Joann Qiu, Intel, gave a talk entitled, "ASI Development Focus,"

Attachment: IAASIMinutes_11Jul2016_with addendum_18Jul2016

7.3 Int'l SOI Wafers TF/Gerd Pfeiffer (GlobalFoundries)

Bich-Yen (SOITEC) is no longer active in the TF. Gerd Pfeiffer offered to be the TF leader, who has chaired his first TF meeting this week.

Dinesh Gupta reported on Gerd's behalf.

Attachment: Minutes of the NA SOI Meeting 071116

7.4 Int'l Annealed Wafer TF/Dinesh Gupta (STA)

No meeting. The TF is on standby mode.

7.5 Int'l Epitaxial Wafer TF/Dinesh Gupta (STA)

Ballot doc. 5989 - Revision of SEMI M62-0515, Specifications for Silicon Epitaxial Wafers, passed superclean. The TF will also be on standby mode unless new topic arises.

Attachment: Min Epi TF 0716

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

Of notes:

- Doc. 5737A Revision of SEMI MF1391-1107 Substitutional Atomic Carbon Content of Silicon by Infrared Absorption, received two rejects. The reject from Supika Mashiro was found not persuasive. However, Peter Wagner's reject was found persuasive. The document was sent back to the Japan TF for rework.
- A list of 5 year review standards and nonconformance titles standards need attention.
    - 6042, Line Item Revision to SEMI MF1763-0706 (Reapproved 1111)Test Methods for Measuring Contrast of a Linear Polarizer (Title correction for conformance)
    - 6043, Line Item Revision to SEMI MF28-0707 (Reapproved 0912) Test Methods for Minority Carrier Lifetime in Bulk Germanium and Silicon by Measurement of Photoconductivity Decay (Title correction for conformance)
    - 6044, Line Item Revision to SEMI MF673-1014 Test Methods For Measuring Resistivity Of Semiconductor Wafers Or Sheet Resistance Of Semiconductor Films With A Noncontact Eddy-current Gauge (Title correction for conformance)
    - 6045, Line Item Revision to SEMI MF928-1014 Test Methods For Edge Contour Of Circular Semiconductor Wafers And Rigid Disk Substrates (Title correction for conformance)
    - 6046, Line Item Revision to SEMI MF1982-0714 Test Methods For Analyzing Organic Contaminants On Silicon Wafer Surfaces By Thermal Desorption Gas Chromatography (Title correction for conformance)
    - 6047, Reapproval of SEMI MF728-1106 (Reapproved 1111) Practice for Preparing an Optical Microscope for Dimensional Measurements
    - 6048, Reapproval of SEMI MF978-1106 (Reapproved 1111) Test Method for Characterizing Semiconductor Deep Levels by Transient Capacitance Techniques

Motion: To authorize documents above for cycle 7 for review at SEMICON Japan
By / 2nd: Dinesh Gupta/Tetsuya Nakai
Discussion: None
Vote: 6-0

Attachment: Min Test Methods Mtg 0716

7.7 Int'l Polished Wafers (Substrates) TF/Mike Goldstein, John Valley

Mike Goldstein reported. Of Notes.

- Doc. 5993 Line Item Revision of SEMI M1-0416, Specification for Polished Single Crystal Silicon Wafers

    - Line Item 1: Clarify the heading and intent of section 7
- Doc. 6019, Line Item Revision of SEMI M1-0416, Specification for Polished Single Crystal Silicon Wafers
    - Line Item 1: Correct and update Figure 3
    - Line Item 2: Remove redundant notes from the caption of Figure 7, and delete the term "outer" before "FQA boundary"
    - Line Item 3 - Point out in ¶R3-4.4 that minority carrier lifetime measurements in electronic silicon manufacture must be controlled by recombination at impurities
    - Line Item 4 - Add "and bow" to Note 13.
    - Line Item 5 - Add "and 450" to ¶R3-9.5 and correct the reference to ¶R3-9.4.
- Doc. 5993 and line items 1, 2, 4 and 5 of Doc. 6019 passed as balloted.
- Line item 3 of Doc. 6019 failed.
- Base on comments from John Valley and Peter Wagner, Figure 3 and Figure 7 of M1 need to be revised. There were different opinions on how the figures should be. This topic will be considered for new business.
- On a side note, Mike Goldstein stepped down from the leadership.

Attachment: 2016 Min PW TF Mtg by Mike 0716

7.8 Int'l Terminology TF/TBD

The GCS discussed and recommended SEMI M59-1014 - Terminology for Silicon Technology cease to exist. It is unwieldy to maintain M59. Instead, the GCS proposes whenever a Silicon Wafer Standard is due for 5 year review, terms in M59 should be removed to its original standards. This process is continuing until all terms in M59 are completely removed.

8 Old Business

None

9 New Business

9.1 5 Year Review

5 year review standards are addressed in section 7.6, under Int'l Test Methods TF report.

9.2 TF leaders review

Noel Poduje provided the list of the NA TF leaders. New leader is added. Retired leader is removed.

Attachment: SiWaf Leaders July 12 2016

9.3 Ballots for review at SEMICON Europa

Peter Wagner requested the list for upcoming ballots for review at Europe meeting.

Action Item #1: Kevin Nguyen to provide the list for Peter Wagner and Fritz Passek.

10 Next Meeting and Adjournment

The next meeting is scheduled for Tuesday, April 4, 2017 the NA Fall Standards meetings at SEMI HQ in San Jose, CA. See http://www.semi.org/en/events for the current list of meeting schedules.

Having no further business, a motion was made to adjourn. Adjournment was at 12:00 PM.

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 8 Index of Available Attachments#1

Title	*Title*
Sch SiWfr 0417	Doc.5915_M1 Line Item Revision_r3
SCEU2016_StandardsSchedule V1 20160711r2	awgmaterials.zip
2016.07.12 Silicon Wafer Japan_N_R1.0	IAASIMinutes_11Jul2016_with addendum_18Jul2016
Staff Report June 2016 Wafer	Minutes of the NA SOI Meeting 071116
5744A Procedural Review	Min Epi TF 0716
5737A Procedural Review	Min Test Methods Mtg 0716
5989 Procedural Review	2016 Min PW TF Mtg by Mike 0716
5990 Procedural Review	SiWaf Leaders July 12 2016
5994 Procedural Review	
5993 Procedural Review	
6019 Procedural Review	

#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.