



Silicon Wafer NA TC Chapter Meeting Summary and Minutes

Summer Meeting
Tuesday, July 13, 2021
2:00 PM – 6:00 PM
Online

TC Chapter Announcements

Next TC Chapter Meeting
Spring 2022, Milpitas, CA in conjunction with the NA Spring Meeting 2022. Check www.semi.org/en/standards for the latest update.

Table 1 Meeting Attendees

Co-Chairs: Dinesh Gupta (STA), Noel Poduje (SMS)

SEMI Staff: Kevin Nguyen (SEMI HQ),

<i>Company</i>	<i>Last</i>	<i>First</i>	<i>Company</i>	<i>Last</i>	<i>First</i>
<i>Wooptix</i>	<i>Gaudestad</i>	<i>Jan</i>	<i>SMS</i>	<i>Poduje</i>	<i>Noel</i>
<i>STA</i>	<i>Gupta</i>	<i>Dinesh</i>	<i>MEMC</i>	<i>Ruprecht</i>	<i>David</i>
<i>KLA</i>	<i>Haller</i>	<i>Kurt</i>	<i>GlobalWafers Japan</i>	<i>Takeda</i>	<i>Ryuji</i>
<i>Self</i>	<i>Kelly</i>	<i>George</i>	<i>Self</i>	<i>Valley</i>	<i>John</i>
<i>TEL</i>	<i>Machida</i>	<i>Ryo</i>	<i>Self</i>	<i>Wagner</i>	<i>Peter</i>
<i>SUMCO</i>	<i>Nakai</i>	<i>Tetsuya</i>	<i>Self</i>	<i>Yoshise</i>	<i>Masanori</i>
<i>Siltronic</i>	<i>Passek</i>	<i>Fritz</i>			

Italic indicates remote 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>
6462	Line Item Revision to SEMI M1-0918, Specification For Polished Single Crystal Silicon Wafers (Re: Illustrations of Flatness and Shape Metrics)	Failed and returned to TF
6753	Reapproval of SEMI MF723-0307E (Reapproved 0412)E Practice for Conversion Between Resistivity and Dopant or Carrier Density for Boron-Doped, Phosphorous-Doped, and Arsenic-Doped Silicon	Passed as balloted
6754	Reapproval of SEMI MF674-0316 Practice for Preparing Silicon for Spreading Resistance Measurements	Passed as balloted
6755	Reapproval of SEMI MF533-0310 (Reapproved 0416) Test Method for Thickness and Thickness Variation of Silicon Wafers	Failed and returned to TF
6756	Reapproval of SEMI MF43-0316 Test Method for Resistivity of Semiconductor Materials	Passed as balloted
6757	Reapproval of SEMI MF42-0316 Test Method for Conductivity Type of Extrinsic Semiconducting Materials	Passed as balloted



<i>Document #</i>	<i>Document Title</i>	<i>Committee Action</i>
6758	Reapproval of SEMI MF2139-1103 (Reapproved 0416) Test Method for Measuring Nitrogen Concentration in Silicon Substrates by Secondary Ion Mass Spectrometry	Passed as balloted
6759	Reapproval of SEMI MF1811-1116 Guide for Estimating the Power Spectral Density Function and Related Finish Parameters from Surface Profile Data	Passed as balloted
6760	Reapproval of SEMI MF1771-0416 Test Method for Evaluating Gate Oxide Integrity by Voltage Ramp Technique	Passed as balloted
6761	Reapproval of SEMI MF1535-1015 Test Method for Carrier Recombination Lifetime in Electronic-Grade Silicon Wafers by Noncontact Measurement of Photoconductivity Decay by Microwave Reflectance	Passed as balloted
6762	Reapproval of SEMI MF1529-1110 (Reapproved 1115) Test Method for Sheet Resistance Uniformity Evaluation by In-Line Four-Point Probe with the Dual-Configuration Procedure	Passed as balloted
6763	Reapproval of SEMI MF1239-0305 (Reapproved 0416) Test Method for Oxygen Precipitation Characteristics of Silicon Wafers by Measurement of Interstitial Oxygen Reduction	Passed as balloted
6764	Reapproval of SEMI MF1153-1110 (Reapproved 1015) Test Method for Characterization of Metal-Oxide Silicon (MOS) Structures by Capacitance-Voltage Measurements	Passed as balloted
6765	Reapproval of SEMI MF1152-0316 Test Method for Dimensions of Notches on Silicon Wafers	Passed as balloted
6766	Reapproval of SEMI M57-0316 Specification for Silicon Annealed Wafers	Passed as balloted
6787	Reapproval of SEMI MF951 - Test Method for Determination of Radial Interstitial Oxygen Variation in Silicon Wafers	Passed as balloted
6788	Reapproval of SEMI MF847 - Test Method for Measuring Crystallographic Orientation of Flats on Single Crystal Silicon Wafers by X-Ray Techniques	Passed as balloted
6789	Reapproval of SEMI MF81 - Test Method for Measuring Radial Resistivity Variation on Silicon Wafers	Passed as balloted
6790	Reapproval of SEMI MF1809 - Guide for Selection and Use of Etching Solutions to Delineate Structural Defects in Silicon	Passed as balloted
6791	Reapproval of SEMI MF1810 - Test Method for Counting Preferentially Etched or Decorated Surface Defects in Silicon Wafers	Passed as balloted
6792	Reapproval of SEMI MF1725 - Practice for Analysis of Crystallographic Perfection of Silicon Ingots	Passed as balloted
6793	Reapproval of SEMI MF1726 - Practice for Analysis of Crystallographic Perfection of Silicon Wafers	Passed as balloted
6794	Reapproval of SEMI MF1727 - Practice for Detection of Oxidation Induced Defects in Polished Silicon Wafers	Passed as balloted
6795	Reapproval of SEMI MF1617 - Test Method for Measuring Surface Sodium, Aluminum, Potassium, and Iron on Silicon and EPI Substrates by Secondary Ion Mass Spectrometry	Passed as balloted
6796	Reapproval of SEMI MF1618 - Practice for Determination of Uniformity of Thin Films on Silicon Wafers	Passed as balloted
6797	Reapproval of SEMI MF154 - Guide for Identification of Structures and Contaminants Seen on Specular Silicon Surfaces	Passed as balloted
6798	Reapproval of SEMI MF1389 - Test Method for Photoluminescence Analysis of Single Crystal Silicon for III-V Impurities	Passed as balloted
6799	Reapproval of SEMI M66 - Test Method to Extract Effective Work Function in Oxide and High-K Gate Stacks Using the MIS Flat Band Voltage-Insulator Thickness Technique	Passed as balloted
6800	Reapproval of SEMI M16 - Specification for Polycrystalline Silicon	Passed as balloted
6801	Reapproval of SEMI M17 - Guide for a Universal Wafer Grid	Passed as balloted

#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
6753	SNARF	Int'l Test Methods TF	Reapproval of SEMI MF723-0307E (Reapproved 0412)E Practice for Conversion Between Resistivity and Dopant or Carrier Density for Boron-Doped, Phosphorous-Doped, and Arsenic-Doped Silicon
6754	SNARF	Int'l Test Methods TF	Reapproval of SEMI MF674-0316 Practice for Preparing Silicon for Spreading Resistance Measurements
6755	SNARF	Int'l Test Methods TF	Reapproval of SEMI MF533-0310 (Reapproved 0416) Test Method for Thickness and Thickness Variation of Silicon Wafers
6756	SNARF	Int'l Test Methods TF	Reapproval of SEMI MF43-0316 Test Method for Resistivity of Semiconductor Materials
6757	SNARF	Int'l Test Methods TF	Reapproval of SEMI MF42-0316 Test Method for Conductivity Type of Extrinsic Semiconducting Materials
6758	SNARF	Int'l Test Methods TF	Reapproval of SEMI MF2139-1103 (Reapproved 0416) Test Method for Measuring Nitrogen Concentration in Silicon Substrates by Secondary Ion Mass Spectrometry
6759	SNARF	Int'l Test Methods TF	Reapproval of SEMI MF1811-1116 Guide for Estimating the Power Spectral Density Function and Related Finish Parameters from Surface Profile Data
6760	SNARF	Int'l Test Methods TF	Reapproval of SEMI MF1771-0416 Test Method for Evaluating Gate Oxide Integrity by Voltage Ramp Technique
6761	SNARF	Int'l Test Methods TF	Reapproval of SEMI MF1535-1015 Test Method for Carrier Recombination Lifetime in Electronic-Grade Silicon Wafers by Noncontact Measurement of Photoconductivity Decay by Microwave Reflectance
6762	SNARF	Int'l Test Methods TF	Reapproval of SEMI MF1529-1110 (Reapproved 1115) Test Method for Sheet Resistance Uniformity Evaluation by In-Line Four-Point Probe with the Dual-Configuration Procedure
6763	SNARF	Int'l Test Methods TF	Reapproval of SEMI MF1239-0305 (Reapproved 0416) Test Method for Oxygen Precipitation Characteristics of Silicon Wafers by Measurement of Interstitial Oxygen Reduction
6764	SNARF	Int'l Test Methods TF	Reapproval of SEMI MF1153-1110 (Reapproved 1015) Test Method for Characterization of Metal-Oxide Silicon (MOS) Structures by Capacitance-Voltage Measurements
6765	SNARF	Int'l Test Methods TF	Reapproval of SEMI MF1152-0316 Test Method for Dimensions of Notches on Silicon Wafers
6766	SNARF	Int'l Test Methods TF	Reapproval of SEMI M57-0316 Specification for Silicon Annealed Wafers
6787	SNARF	Int'l Test Methods TF	Reapproval of SEMI MF951 Test Method for Determination of Radial Interstitial Oxygen Variation in Silicon Wafers
6788	SNARF	Int'l Test Methods TF	Reapproval of SEMI MF847 Test Method for Measuring Crystallographic Orientation of Flats on Single Crystal Silicon Wafers by X-Ray Techniques
6789	SNARF	Int'l Test Methods TF	Reapproval of SEMI MF81 Test Method for Measuring Radial Resistivity Variation on Silicon Wafers
6790	SNARF	Int'l Test Methods TF	Reapproval of SEMI MF1809 Guide for Selection and Use of Etching Solutions to Delineate Structural Defects in Silicon
6791	SNARF	Int'l Test Methods TF	Reapproval of SEMI MF1810 Test Method for Counting Preferentially Etched or Decorated Surface Defects in Silicon Wafers
6792	SNARF	Int'l Test Methods TF	Reapproval of SEMI MF1725 Practice for Analysis of Crystallographic Perfection of Silicon Ingots
6793	SNARF	Int'l Test Methods TF	Reapproval of SEMI MF1726 Practice for Analysis of Crystallographic Perfection of Silicon Wafers
6794	SNARF	Int'l Test Methods TF	Reapproval of SEMI MF1727 Practice for Detection of Oxidation Induced Defects in Polished Silicon Wafers
6795	SNARF	Int'l Test Methods TF	Reapproval of SEMI MF1617 Test Method for Measuring Surface Sodium, Aluminum, Potassium, and Iron on Silicon and EPI Substrates by Secondary Ion Mass Spectrometry

#	Type	SC/TF/WG	Details
6796	SNARF	Int'l Test Methods TF	Reapproval of SEMI MF1618 Practice for Determination of Uniformity of Thin Films on Silicon Wafers
6797	SNARF	Int'l Test Methods TF	Reapproval of SEMI MF154 Guide for Identification of Structures and Contaminants Seen on Specular Silicon Surfaces
6798	SNARF	Int'l Test Methods TF	Reapproval of SEMI MF1389 Test Method for Photoluminescence Analysis of Single Crystal Silicon for III-V Impurities
6799	SNARF	Int'l Test Methods TF	Reapproval of SEMI M66 Test Method to Extract Effective Work Function in Oxide and High-K Gate Stacks Using the MIS Flat Band Voltage-Insulator Thickness Technique
6800	SNARF	Int'l Test Methods TF	Reapproval of SEMI M16 Specification for Polycrystalline Silicon
6801	SNARF	Int'l Test Methods TF	Reapproval of SEMI M17 Guide for a Universal Wafer Grid

Table 5 Authorized Activities

#	Type	SC/TF/WG	Details
6824	SNARF	Int'l ASI TF	Line Item Revision of SEMI MF1048 Test Method for Measuring the Reflective Total Integrated Scatter
TBD	SNARF	Int'l Test Methods TF	Reapproval of SEMI MF978-1106 (Reapproved 0317) Test Method for Characterizing Semiconductor Deep Levels by Transient Capacitance Techniques
TBD	SNARF	Int'l Test Methods TF	Reapproval of SEMI MF928-0317 Test Method for Edge Contour of Circular Semiconductor Wafers and Rigid Disk Substrates
TBD	SNARF	Int'l Test Methods TF	Reapproval of SEMI MF728-1106 (Reapproved 0317) Practice for Preparing an Optical Microscope for Dimensional Measurements
TBD	SNARF	Int'l Test Methods TF	Reapproval of SEMI MF673-0317 Test Method for Measuring Resistivity of Semiconductor Wafers or Sheet Resistance of Semiconductor Films with a Noncontact Eddy-Current Gauge
TBD	SNARF	Int'l Test Methods TF	Reapproval of SEMI MF28-0317 Test Method for Minority Carrier Lifetime in Bulk Germanium and Silicon by Measurement of Photoconductivity Decay

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
TBD	Cycle 7 or 8	Int'l Test Methods TF	Reapproval of SEMI MF978-1106 (Reapproved 0317) Test Method for Characterizing Semiconductor Deep Levels by Transient Capacitance Techniques
TBD	Cycle 7 or 8	Int'l Test Methods TF	Reapproval of SEMI MF928-0317 Test Method for Edge Contour of Circular Semiconductor Wafers and Rigid Disk Substrates
TBD	Cycle 7 or 8	Int'l Test Methods TF	Reapproval of SEMI MF728-1106 (Reapproved 0317) Practice for Preparing an Optical Microscope for Dimensional Measurements
TBD	Cycle 7 or 8	Int'l Test Methods TF	Reapproval of SEMI MF673-0317 Test Method for Measuring Resistivity of Semiconductor Wafers or Sheet Resistance of Semiconductor Films with a Noncontact Eddy-Current Gauge
TBD	Cycle 7 or 8	Int'l Test Methods TF	Reapproval of SEMI MF28-0317 Test Method for Minority Carrier Lifetime in Bulk Germanium and Silicon by Measurement of Photoconductivity Decay

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

#	TF	Title	Expiration Date
None			

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
July2021-#1	Fritz Passek (Siltronic)	To develop proposal for Regulations changes regarding (SEMI M1 Illustrations of Flatness and Shape Metrics) guidelines and present at the ERSC.

Table 11 Previous Meeting Action Items

Item #	Assigned to	Details	Status
July2019-#1	Kevin Nguyen (SEMI Staff)	To inform Ulrich Kretzer on the editorial change to the note for addressing his comment for ballot 6461, Reapproval of SEMI M73-1013E Test Method for Extracting Relevant Characteristics from Measured Wafer Edge Profiles.	Completed

1 Welcome, Reminders, and Introductions

1.1 Dinesh Gupta called the meeting to order at 2:00 PM. 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: Friedrich Passek/Kurt Haller

Discussion: None

Vote: 10-0

3 Review of Schedule for the next meeting (NA Spring Meeting, 2022)

3.1 Schedule will be determined when NA Spring 2022 meetings date is determined.

Liaison Reports

3.2 *Europe TC Chapter*

No meeting, and no report since 2019.

3.3 Japan TC Chapter

3.3.1 Nakai-san reported for the Japan TC Chapter.

- Last meeting
 - Friday, January 15, 2021 at the SEMI Standards Japan Winter Meetings
- Next meeting
 - Wednesday, August 25, 2021 at the SEMI Standards Japan Summer Meetings
- Leadership Changes
 - Previous Leader
 - Naoyuki Kawai (Meiji University)
 - New Leader
 - Ryuji Takeda (Global Wafers Japan)

Attachment: 01, 202106_SiliconWafer-Japan_LiaisonR_v1.0

3.4 GCS Report

3.4.1 Dinesh Gupta reported.

- File extension format.
 - Requested from Siltronic that all files with extension (.doc, ppt, and .xls) should not be used. Rather, all files (.docx, .pptx, .xlsx, and .pdf) are ok for circulation via email distribution.
- 5 year review process
 - So far, it has been ok. If any documents is due for 5 year review, it should be issued for reapproval ballot. If a voter has any objection, it will be dealt as it comes up.
- Voting at Virtual Meeting
 - Official Virtual Meeting process has been in place since last year. Japan has conducted its meeting in January. So far, it appears to be ok.
- To propose the reconsideration of Silicon Wafer TC local rule that require all Letter ballot reviews to be conducted at TC chapter meetings held in conjunction with SEMICON show, as OVTCCM can be used and allows global participation.
 - Nakai-san requested reconsideration of previous Silicon Wafer GCS policy on ballot reviews. With the availability of OVTCCM, he feels that ballots can be reviewed at anywhere and anytime, and it should not be just strictly to 3 international meetings. Are 3 times a year is enough or more is needed? If everyone is ok with 3 times, Nakai would also be ok, but he would like everyone's input.
 - Kurt Haller said Nakai brought up a good point. He likes 3 times year, 4 may be a bit too much.
 - Noel Poduje said SEMICON meetings are not as they are used to be. Not every many people are attending the shows. So we need to rethink the concept of international meeting.
 - Peter Wagner said he proposed three meetings as he sent the PowerPoint slides proposal back in December 2020. The concept is to spread out 3 meetings a year for ballot review. This will ease the burden of not having to attend so many meetings.
 - NA would be in July
 - Japan may be in December or January
 - Europe can be in the Spring



- Dinesh Gupta said this idea will need to be discussed again in the future as there was no consensus with Nakai-san's proposal.

Attachment: 02, Agenda GCS NA Mtg 071321 8-9AM

3.5 SEMI Staff Report

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

- SEMI upcoming event
 - SEMICON West, December 7-9, 2021
 - San Francisco, CA
- 2021 Critical Dates for SEMI Standards Ballots
 - <https://www.semi.org/en/collaborate/standards/ballots>
- SEMI Standards Publications
 - Total SEMI Standards in portfolio: 1,046
 - Includes 273 Inactive Standards

Attachment: 03, Staff Report July 2021_v1 sw

4 Regulations Change Report (if applicable)

4.1 Kevin Nguyen reported.

- New Forms, Regulations & Procedure Manual
 - Regulations and Procedure Manual (November 5, 2020)
 - Clarification on § 6.5, Disbandment of a TC Chapter
 - Requires an RSC to disband a TC Chapter when it is shown to be inactive by failing to:
 - hold meetings for two consecutive years,
 - report activity to its RSC for two consecutive years, or
 - initiate new Standards Documents activities.

5 Ballot Review

5.1 Document 6462, Line Item Revision to SEMI M1-0918, Specification For Polished Single Crystal Silicon Wafers (Re: Moving Illustrations of Flatness and Shape Metrics from Appendix to Related Information)

5.1.1 Discussion:

- Masanori Yoshise: Presented the M1 Revision History for illustrations at Appendix. His argument is that document with flatness illustration at appendix 1 was approved and published in M1-0918. Per Yoshise, there is no issue to put illustration in the Appendix in Regulations point of view. The illustrations are good enough for purpose of helping understand of measurement parameters.
- Peter Wagner: According to SEMI Regulations the metric illustrations do not belong in an appendix as they are not required for using SEMI M1. SEMI M1 exists for nearly 50 years without these illustrations. He cited the definition of Appendix and Related Information from the Regs below. He also reported that there was 39 voters accepted the ballot as he tried to persuade members voting to find not persuasive.
 - “4.2.7 Appendix, n. Official material required for using a Standard or Safety Guideline, published as a separate and distinct section within that Document.”

- “4.2.8 Related Information, n. A category of Supplementary Material that is not required for using the Standard or Safety Guideline and is published as a separate and distinct section within that Document.”
- Fritz Passek: The discussion did not go anywhere. Fritz suggested that we should ask the user’s perspective. Are they ok with the proposal? He asked if there is something in the Regulations that would allow a new type of document that would allow to proceed with this illustration
- Noel Poduje: Suggested Fritz Passek to develop a clear proposal and present to the ERSC or NARSC for the Regulations to improve.

5.1.2 This document **failed** and returned to TF for rework. Please refer to A&R attachment for details of adjudication.

Attachment: 04, PW update

Attachment: 05, doc6462 response to negatives

Attachment: 06, 6462 A&R fail

5.2 Document 6755, Reapproval of SEMI MF533-0310 (Reapproved 0416) Test Method for Thickness and Thickness Variation of Silicon Wafers

5.2.1 This document **failed** and returned to TF for rework.

5.3 Document 6753, Reapproval of SEMI MF723-0307E (Reapproved 0412)E Practice for Conversion Between Resistivity and Dopant or Carrier Density for Boron-Doped, Phosphorous-Doped, and Arsenic-Doped Silicon

5.3.1 This document passed as balloted.

5.4 Document 6754, Reapproval of SEMI MF674-0316 Practice for Preparing Silicon for Spreading Resistance Measurements

5.4.1 This document passed as balloted.

5.5 Document 6756, Reapproval of SEMI MF43-0316 Test Method for Resistivity of Semiconductor Materials

5.5.1 This document passed as balloted.

5.6 Document 6757, Reapproval of SEMI MF42-0316 Test Method for Conductivity Type of Extrinsic Semiconducting Materials

5.6.1 This document passed as balloted.

5.7 Document 6758, Reapproval of SEMI MF2139-1103 (Reapproved 0416) Test Method for Measuring Nitrogen Concentration in Silicon Substrates by Secondary Ion Mass Spectrometry

5.7.1 This document passed as balloted.

5.8 Document 6759, Reapproval of SEMI MF1811-1116 Guide for Estimating the Power Spectral Density Function and Related Finish Parameters from Surface Profile Data

5.8.1 This document passed as balloted.

5.9 Document 6760, Reapproval of SEMI MF1771-0416 Test Method for Evaluating Gate Oxide Integrity by Voltage Ramp Technique

5.9.1 This document passed as balloted.

5.10 Document 6761, Reapproval of SEMI MF1535-1015 Test Method for Carrier Recombination Lifetime in Electronic-Grade Silicon Wafers by Noncontact Measurement of Photoconductivity Decay by Microwave Reflectance

5.10.1 This document passed as balloted.

5.11 Document 6762, Reapproval of SEMI MF1529-1110 (Reapproved 1115) Test Method for Sheet Resistance Uniformity Evaluation by In-Line Four-Point Probe with the Dual-Configuration Procedure



- 5.11.1 This document passed as balloted.
- 5.12 Document 6763, Reapproval of SEMI MF1239-0305 (Reapproved 0416) Test Method for Oxygen Precipitation Characteristics of Silicon Wafers by Measurement of Interstitial Oxygen Reduction
 - 5.12.1 This document passed as balloted.
- 5.13 Document 6764, Reapproval of SEMI MF1153-1110 (Reapproved 1015) Test Method for Characterization of Metal-Oxide Silicon (MOS) Structures by Capacitance-Voltage Measurements
 - 5.13.1 This document passed as balloted.
- 5.14 Document 6765, Reapproval of SEMI MF1152-0316 Test Method for Dimensions of Notches on Silicon Wafers
 - 5.14.1 This document passed as balloted.
- 5.15 Document 6766, Reapproval of SEMI M57-0316 Specification for Silicon Annealed Wafers
 - 5.15.1 This document passed as balloted.
- 5.16 Document 6787, Reapproval of SEMI MF951 - Test Method for Determination of Radial Interstitial Oxygen Variation in Silicon Wafers
 - 5.16.1 This document passed as balloted.
- 5.17 Document 6788, Reapproval of SEMI MF847 - Test Method for Measuring Crystallographic Orientation of Flats on Single Crystal Silicon Wafers by X-Ray Techniques
 - 5.17.1 This document passed as balloted.
- 5.18 Document 6789, Reapproval of SEMI MF81 - Test Method for Measuring Radial Resistivity Variation on Silicon Wafers
 - 5.18.1 This document passed as balloted.
- 5.19 Document 6790, Reapproval of SEMI MF1809 - Guide for Selection and Use of Etching Solutions to Delineate Structural Defects in Silicon
 - 5.19.1 This document passed as balloted.
- 5.20 Document 6791, Reapproval of SEMI MF1810 - Test Method for Counting Preferentially Etched or Decorated Surface Defects in Silicon Wafers
 - 5.20.1 This document passed as balloted.
- 5.21 Document 6792, Reapproval of SEMI MF1725 - Practice for Analysis of Crystallographic Perfection of Silicon Ingots
 - 5.21.1 This document passed as balloted.
- 5.22 Document 6793, Reapproval of SEMI MF1726 - Practice for Analysis of Crystallographic Perfection of Silicon Wafers
 - 5.22.1 This document passed as balloted.
- 5.23 Document 6794, Reapproval of SEMI MF1727 - Practice for Detection of Oxidation Induced Defects in Polished Silicon Wafers
 - 5.23.1 This document passed as balloted.
- 5.24 Document 6795, Reapproval of SEMI MF1617 - Test Method for Measuring Surface Sodium, Aluminum, Potassium, and Iron on Silicon and EPI Substrates by Secondary Ion Mass Spectrometry
 - 5.24.1 This document passed as balloted.
- 5.25 Document 6796, Reapproval of SEMI MF1618 - Practice for Determination of Uniformity of Thin Films on Silicon Wafers
 - 5.25.1 This document passed as balloted.

5.26 Document 6797, Reapproval of SEMI MF154 - Guide for Identification of Structures and Contaminants Seen on Specular Silicon Surfaces

5.26.1 This document passed as balloted.

5.27 Document 6798, Reapproval of SEMI MF1389 - Test Method for Photoluminescence Analysis of Single Crystal Silicon for III-V Impurities

5.27.1 This document passed as balloted.

5.28 Document 6799, Reapproval of SEMI M66 - Test Method to Extract Effective Work Function in Oxide and High-K Gate Stacks Using the MIS Flat Band Voltage-Insulator Thickness Technique

5.28.1 This document passed as balloted.

5.29 Document 6800, Reapproval of SEMI M16 - Specification for Polycrystalline Silicon

5.29.1 This document passed as balloted.

5.30 Document 6801, Reapproval of SEMI M17 - Guide for a Universal Wafer Grid

5.30.1 This document passed as balloted.

Attachment: 07, SiWaferJuly2021A&R

6 Task Force Reports

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

6.1.1 Noel reported. Of note:

- Ballot review
 - None
- Old Business
 - 1) Advanced 200mm wafer requirements
 - Len Perroots said MicroSense will present recent advances in the capabilities of its tool at the Europa meeting.
 - 2) Wafer requirements for EUV and M49 extension beyond 16nm technology node
 - Nothing new on these topics at this meeting was reported. A general discussion was ensued. Peter Wagner will try to get input/presentation from ASML regarding EUV flatness.
- New Business
 - 5-year review
 - M70 (Partial Site Flatness) will be handled by Europe.

Attachment: 8, AWG NA Summer2021 minutes DRAFT

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

6.2.1 Kurt reported. Of note:

6.2.2 Ballot development

- Doc #tbd: SEMI M40-1114 5-yr review: Guide for Measurement of Roughness of Planar Surfaces on Polished Wafers
- Doc #tbd: SEMI MF1048-0217 revision: Test Method for Measuring Reflective Total Integrated Scatter

Motion: To approve a Line Item Revision for SEMI MF1048-0217 SNARF
By / 2nd: Kurt Haller/ Masanori Yoshise
Discussion: None
Vote: 7-0. Motion passed.

6.2.3 Old business

- LSE definition: Consensus choice: “light scattering equivalent”. Policy going forward: documents up for revision/review will: a) remove M59 citations; b) define LSE per consensus; c) clarify the LSE material (e.g. PSL, SiO₂, etc.)
- Haze ref standards: Frank Riedel and European TF will drive further efforts

Attachment: 9, IAASI_NA_Summer_12_Jul_2021

6.3 *Int’l SOI Wafers TF/Gerd Pfeiffer (SOITEC)*

6.3.1 Dinesh Gupta reported. Of note:

6.3.2 Gerd Pfeiffer is changing employer to SOITEC. He is working on a new document 6583, New Standard: Specification for SOI Wafers for RF Device Applications.

Attachment: 10, SEMI Std SOI TF Meeting Minutes 07122021

6.4 *Int’l Test Methods TF/Dinesh Gupta (STA)*

6.4.1 Dinesh Gupta reported. Of note:

- Activities in SEMI Japan: Two Ballots on New Test Methods Documents passed at Japan.
 - 1) DOC 5981 NEW STANDARD: Test Method for Recombination Lifetime of the Epilayer of the Silicon Epitaxial Wafer (p/p+, n/n+) by the Short Wavelength Excitation Microwave Photoconductive Decay Method, and
 - 2) DOC 6526B NEW STANDARD: Test Method for Bulk Micro Defect Density and Denuded Zone Width in Annealed Silicon Wafers by Optical Microscopy After Preferential etching
- Ballot Review: All reapproval ballots
 - SEMI MF723, SEMI MF674, SEMI MF533, SEMI MF43, SEMI MF42, SEMI MF2139, SEMI MF1811, SEMI MF1771, SEMI MF1535, SEMI MF1529, SEMI MF1239, SEMI MF1153, SEMI MF1152, and SEMI M57
 - SEMI MF533 – Received negative from John Valley,
 - “Paragraph 3.3 contains error(s) when discussing the reported areas of measurement points. The proposed solution is to discuss, in general terms, the difference between discrete point measurement methods and FQA mapping measurement methods.”
 - TF decided to accept the negative, “technically persuasive”
 - SEMI M57 – Received Accept with Comment from Jan Gaudestad,



- “Is there any specific reason why this standards document cannot cover device technology generations below 22nm? The document as written seems to limit this document to 22nm and above technology nodes.”
 - It was decided to send the comment to TF for New Business.
- SEMI MF951, SEMI MF847, SEMI MF81, SEMI MF1809, SEMI MF1810, SEMI MF1725, SEMI MF1726, SEMI MF1727, SEMI MF1617, SEMI MF1618, SEMI MF154, SEMI MF1389, SEMI MF66, SEMI M16, and SEMI M17
 - SEMI MF1726 – Received Accept with Comment from Kurt Haller,
 - “Paragraph 1.4 reads: This Practice provides guidance regarding procedures for analysis of crystal defects of silicon ingots from which silicon wafers are cut”, But, the standard pertains to wafers and not ingots...
 - It was decided to send the comment to TF for New Business.
- All passed except for doc. 6755 – MF533 which received a persuasive negative
- 5 Year Review. The following documents are due for 5 year review.
 - SEMI MF978-1106 (Reapproved 0317) Test Method for Characterizing Semiconductor Deep Levels by Transient Capacitance Techniques
 - SEMI MF928-0317 Test Method for Edge Contour of Circular Semiconductor Wafers and Rigid Disk Substrates
 - SEMI MF728-1106 (Reapproved 0317) Practice for Preparing an Optical Microscope for Dimensional Measurements
 - SEMI MF673-0317 Test Method for Measuring Resistivity of Semiconductor Wafers or Sheet Resistance of Semiconductor Films with a Noncontact Eddy-Current Gauge
 - SEMI MF28-0317 Test Method for Minority Carrier Lifetime in Bulk Germanium and Silicon by Measurement of Photoconductivity Decay

Motion: To authorize 5 documents above for cycle 7 or 8 for review at SEMICON Japan in December 2021

By / 2nd: Tetsuya Nakai/ Kurt Haller

Discussion: None

Vote: 8-0. Motion passed.

Attachment: 11, Min Test Methods Mtg 071221

6.5 Int'l Polished Wafers (Substrates) TF/Dinesh Gupta

6.5.1 Dinesh Dupta reported.

- Doc #6462 - Line Item Revision to SEMI M1-0918, Specification For Polished Single Crystal Silicon Wafers (Changes to Related Information 4 and other pertinent sections), failed TC review.

Attachment: 12, Min IPW TF 071221

7 Old Business

None

8 New Business

None



9 Next Meeting and Adjournment

9.1 The next meeting is scheduled for April, 2022 in Milpitas, CA. See <http://www.semi.org/en/events> for the current list of meeting schedules.

9.2 Having no further business, a motion was made to adjourn. Adjournment was at 5:00 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 12 Index of Available Attachments#1

<i>Title</i>	<i>Title</i>
202106_SiliconWafer-Japan_LiaisonR_v1.0	SiWaferJuly2021A&R
Agenda GCS NA Mtg 071321 8-9AM	AWG NA Summer2021 minutes DRAFT
Staff Report July 2021_v1 sw	IAASI_NA_Summer_12_Jul_2021
PW update	SEMI Std SOI TF Meeting Minutes 07122021
doc6462 response to negatives	Min Test Methods Mtg 071221
6462 A&R fail	Min IPW TF 071221

#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.