



MEMS/NEMS North America TC Chapter

Meeting Summary and Minutes

NA Standards Fall Meetings 2020

Monday, November 16, 10:00 – 11:00 Pacific

via Official Virtual TC Chapter Meeting (OVTCCM)

TC Chapter Announcements

Next TC Chapter Meeting

Monday, January 11, 10:00 – 11:30 Pacific [*Cancelled*]

via Official Virtual TC Chapter Meeting (OVTCCM)

Table 1 Meeting Attendees

Italics indicate virtual participants

Co-Chairs: Steve Martell (Nordson SONOSCAN), Michelle Bourke (Lam Research)

SEMI Staff: Laura Nguyen

| <i>Company</i> | <i>Last</i> | <i>First</i> | <i>Company</i> | <i>Last</i> | <i>First</i> |
|---------------------------------------|-------------------------|-----------------|-----------------------|----------------|----------------|
| <i>AM Fitzgerald & Associates</i> | <i>Khademolhosseini</i> | <i>Farzad</i> | <i>TDK Invensense</i> | <i>Rao</i> | <i>Sreeni</i> |
| <i>Camenzind Solutions</i> | <i>Camenzind</i> | <i>Mark</i> | | | |
| <i>Lam Research</i> | <i>Bourke</i> | <i>Michelle</i> | <i>SEMI</i> | <i>Chung</i> | <i>Soomin</i> |
| <i>Nordson SONOSCAN</i> | <i>Martell</i> | <i>Steve</i> | <i>SEMI</i> | <i>Nguyen</i> | <i>Laura</i> |
| <i>Okmetic</i> | <i>Santala</i> | <i>Petri</i> | <i>SEMI</i> | <i>Nguyen</i> | <i>Thai</i> |
| <i>SoftMEMS LLC</i> | <i>Maher</i> | <i>Mary Ann</i> | <i>SEMI</i> | <i>Sansone</i> | <i>Carmelo</i> |

Table 2 Leadership Changes

| <i>WG/TF/SC/TC Name</i> | <i>Previous Leader</i> | <i>New Leader</i> |
|---|------------------------|-----------------------------|
| MEMS and Miniaturized Gas Sensing Task Force [New] | None | Sreeni Rao (TDK Invensense) |

Table 3 Committee Structure Changes

| <i>Previous WG/TF/SC Name</i> | <i>New WG/TF/SC Name or Status Change</i> |
|-------------------------------|---|
| None | MEMS and Miniaturized Gas Sensing Task Force [New] |

Table 4 Ballot Results

| <i>Document #</i> | <i>Document Title</i> | <i>Committee Action</i> |
|-------------------|--|--|
| 6007 | New Standard: Specification for Silicon Substrates used in Fabrication of MEMS Devices | Passed; Ratification Ballot to be issued. |

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

| # | Type | SC/TF/WG | Details |
|------|----------------------|-----------------------------------|--|
| 6007 | Ballot Authorization | MEMS Material Characterization TF | New Standard: Guide for Use of Test Patterns for Characterizing a Deep Reactive Ion Etching (DRIE) Process – <i>To ballot in voting Cycle 5-2020</i> – <i>Approved by GCS on 05/12/2020</i> |
| 6007 | Ballot Authorization | MEMS Material Characterization TF | New Standard: Guide for Use of Test Patterns for Characterizing a Deep Reactive Ion Etching (DRIE) Process – <i>To ballot in voting Cycle 6 or 7-2020</i> – <i>Approved by GCS on 08/12/2020</i> |

Table 6 Authorized Activities

Listing of all revised or new SNARF(s) approved by the Originating TC Chapter.

| # | Type | SC/TF/WG | Details |
|---|------|--------------------------------------|--|
| - | TFOF | MEMS and Miniaturized Gas Sensing TF | MEMS and Miniaturized Gas Sensing Task Force [New] |

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 | TF | Details |
|-------|--------------|-----------------------------------|--|
| R6007 | Cycle 9-2020 | MEMS Material Characterization TF | New Standard: Guide for Use of Test Patterns for Characterizing a Deep Reactive Ion Etching (DRIE) Process |

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

None

Table 9 SNARF(s) Abolished

None

Table 10 Standard(s) to receive Inactive Status

None

Table 11 New Action Items

| Item # | Assigned to | Details |
|------------|------------------------|---|
| 2019Nov#01 | Michelle, Laura | Schedule DRIE Working Meetings. Completed. Closed. |
| 2019Nov#02 | Laura Nguyen | Send MEMS Reliability SNARF to Michelle, Mary Ann, and Alissa. Sent to Michelle. Closed. |
| 2019Nov#03 | Laura, Carmelo, Soomin | Announce publication of 6018 at MSTC in February 2020 and set up a meeting for MSIG WG to meet. Doing topic tables instead of meeting. Completed. Closed. |
| 2019Nov#04 | Steve, Alissa | Find out if MEMS/MSIG WG can meet at Sensors Expo (San Jose, June 2020). Spoke with Charlene in December. Plan to meet early January. Unsure if Sensors Expo is meeting F2F due to pandemic. Closed. |
| 2019Nov#05 | Task Force | Prepare Document 6007 for Cycle 2-2020. Did not complete for Cycle 2-2020. Closed. |

Table 12 Previous Meeting Action Items

None

1 Welcome, Reminders, and Introductions

Steve Martell (Nordson SONOSCAN) called the meeting to order at 10:00. The meeting reminders on antitrust issues, intellectual property issues and holding meetings with international attendance were reviewed. Attendees introduced themselves.

Attachment: SEMI Standards Required Meetings Elements

2 Review of Previous Meeting Minutes

The TC Chapter reviewed the minutes of the previous meeting.

Motion: To accept the previous meeting minutes as written.

By / 2nd: By: Michelle Bourke / Lam Research
Second: Mary Ann Maher / SoftMEMS LLC

Discussion: None.

Vote: 5-0 in favor. Motion passed.

Attachment: [2019Fall] MEMS NEMS NA TC Chapter Meeting Minutes FINAL

3 Liaison Reports

3.1 SEMI Staff Report

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

SEMI Global Calendar of Events

- SEMICON Japan (December 11-18; Virtual Event; Tokyo, Japan)
- SEMICON Korea (February 3-5; Seoul, Korea)
- SEMICON China (March 17-19, 2021; Shanghai, China)
- SEMICON Southeast Asia (May 18-20, 2021; Penang, Malaysia)
- SEMICON West (July 13-15, 2021; San Francisco, CA)
- SEMICON Taiwan (Sept 8-10, 2021; Taipei, Taiwan)

Upcoming 2021 North America Standards Meetings

- NA Standards Spring Meetings (March 29-April 1, SEMI HQ in Milpitas, California) *tentative*
- SEMICON West Meetings (July 12-15, San Francisco, California) *tentative*
- NA Standards Fall Meetings (November 1-4, SEMI HQ in Milpitas, California) *tentative*

Critical Dates for SEMI Standards Ballots

- Cycle 8-2020: Ballot Submission Due: Oct 9/Voting Period: Oct 23 – Nov 23
- Cycle 9-2020: Ballot Submission Due: Nov 10/Voting Period: Nov 23 – Dec 23
- Cycle 1-2021: Ballot Submission Due: Jan 5/Voting Period: Jan 19 – Feb 18
- Cycle 2-2021: Ballot Submission Due: Jan 29/Voting Period: Feb 10 – Mar 12
- Cycle 3-2021: Ballot Submission Due: Mar 9/Voting Period: Mar 23 – Apr 22



- Cycle 4-2021: Ballot Submission Due: Apr 14/Voting Period: Apr 28 – May 28

Critical Dates: <http://www.semi.org/en/Standards/Ballots>

Standards Publications Report

| <i>Cycle</i> | <i>New</i> | <i>Revised</i> | <i>Reapproved</i> | <i>Withdrawn</i> |
|----------------|------------|----------------|-------------------|------------------|
| July 2020 | 0 | 4 | 0 | 0 |
| August 2020 | 1 | 4 | 2 | 0 |
| September 2020 | 0 | 3 | 0 | 0 |
| October 2020 | 1 | 5 | 3 | 0 |

Total in portfolio – 1,027 (includes 274 Inactive Standards)

New Standards

| <i>Cycle</i> | <i>Designation</i> | <i>Title</i> | <i>Committee</i> | <i>Region</i> |
|--------------|--------------------|---|------------------|---------------|
| August 2020 | SEMI PV95 | Test Method for Metal Wrap Through Solar Cell Via Resistance | Photovoltaic | CH |
| October 2020 | SEMI PV96 | Guide for the Design of Testing and Sorting Equipment for Crystalline Silicon Solar Cells | Photovoltaic | CH |

Inactive Standards

| <i>Committee</i> | <i>Number of Inactive Standards</i> |
|----------------------------------|-------------------------------------|
| Assembly & Packaging | 48 |
| Automated Test Equipment | 2 |
| Compound Semiconductor Materials | 4 |
| Environmental Health & Safety | 8 |
| Facilities | 15 |
| FPD – Equipment | 5 |
| FPD – Factory Automation | 14 |
| FPD – Materials & Components | 13 |
| Gases | 18 |
| Information & Control | 37 |
| Liquid Chemicals | 26 |
| MEMS | 3 |
| Metrics | 12 |
| Micropatterning | 30 |
| Photovoltaic | 1 |
| Physical Interfaces & Carriers | 19 |
| Silicon Wafer | 11 |
| Traceability | 8 |

Regulations & Procedure Manual

- *Regulations* ((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.
- *Procedure Manual* (November 5, 2020)
 - New § 6.1.3.4.1 defining detailed procedures for disbandment of inactive TC Chapters.



Official Virtual TC Chapter Meeting Rooms {See attachment for additional slides}

- <https://svm.semi.org/>
 - Do not use Internet Explorer or MS Edge. These browsers have known issues.
- Click “Login”
- Enter your Standards membership username and password
 - Same as the one used for voting on ballots
- Username and password can be retrieved at: <http://ams.semi.org/ebusiness/ForgotUID.aspx>

connect@SEMI - Contact your staff if a TF Site is desired

- Web link - <https://connect.semi.org>
 - Login using Standards account (username and password)
- Program Member
 - Join any task forces; Post discussion thread
- TF Leader/Community Admin; contact your staff if a TF Site is desired
 - Add member; Upload meeting minutes
 - Communicate TF members
- Details
 - www.semi.org/standards >> Committee Info >> Collaboration Community

SNARF(s) Approved by GCS in between TC Chapter Meetings

- 6007, New Standard: Guide for Use of Test Patterns for Characterizing a Deep Reactive Ion Etching (DRIE) Process
 - To ballot in voting Cycle 5-2020
 - Approved by GCS on 05/12/2020
- 6007, New Standard: Guide for Use of Test Patterns for Characterizing a Deep Reactive Ion Etching (DRIE) Process
 - To ballot in voting Cycle 6 or 7-2020
 - Approved by GCS on 05/12/2020

Nonconforming Titles (See PM Appendix 4) {None}

SNARF 3 Year Status, TC Chapter may grant a one-year extension {None}

Five-Year Review

| Designation # | Standard Title | Action By | Original TF assigned to |
|------------------------------------|---|-------------|-------------------------|
| SEMI MS8-0309 (Reapproved 0915) | Guide to Evaluating Hermeticity of Microelectromechanical Systems (MEMS) Packages | Fall 2020 | MEMS Packaging |
| SEMI MS3-0915 | Terminology for MEMS Technology | Fall 2020 | MEMS Terminology |
| SEMI MS4-0416 | Test Method for Young's Modulus Measurements of Thin, Reflecting Films Based on the Frequency of Beams in Resonance | Spring 2021 | MEMS/NEMS NA TC Chapter |

Attachment: Staff Report November 2020_MEMS NEMS

4 Ballot Review

NOTE 1: 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.

4.1 Document # 6007, New Standard: Specification for Silicon Substrates used in Fabrication of MEMS Devices

- The ballot passed TC Chapter review with technical changes. Ratification Ballot to be issued. See attachment for ballot adjudication.

Attachment: 6007_Ballot Review

5 Subcommittee and Task Force Reports

The following task forces are currently inactive:

- Packaging TF
- Terminology TF
- Wafer Bond TF

5.1 MEMS Microfluidics Task Force

This Task Force did not meet. There is no update at this time.

5.2 MEMS Reliability Task Force

This Task Force was reactivated through the MSIG Working Groups. There is no update at this time.

5.3 Joint MSIG, MEMS Substrate, and MEMS Material Characterization Task Force

The Joint Task Force was held during the Committee meeting. The key items are as follows:

- Adjudication of SEMI Draft Document 6007, New Standard: Guide for Use of Test Patterns for Characterizing a Deep Reactive Ion Etching (DRIE) Process
 - The ballot passed TC Chapter review with technical changes. Ratification Ballot to be issued. See attachment for ballot adjudication. [See § 4 for Ballot Results].

Motion: Motion to authorize Document R6007 for ballot in Cycle 9-2020.

By / 2nd: By: Mary Ann Maher / SoftMEMS LLC
Second: Michelle Bourke / Lam Research

Discussion: None.

Vote: 4-0. Motion passed.

6 Old Business

6.1 Previous Action Items

Previous action items are noted in Table 12 in 'red' and for recent updates in 'blue'. There is no further old business.



7 New Business

7.1 New TFOF(s)/SNARF(s)

The Committee reviewed new TFOF for the MEMS and Miniaturized Gas Sensing Task Force. This activity came out of the SEMI/MSIG Device Working Group.

Motion: To approve TFOF for MEMS and Miniaturized Gas Sensing TF.

By / 2nd: By: Sreeni Rao / TDK Invensense
Second: mark Camenzind / Camenzind Solutions

Discussion: None.

Vote: 4-0. Motion passed.

Attachment: TFOF_ MEMS and Miniaturized Gas Sensing Task Force

8 Next Meeting and Adjournment

The next MEMS / NEMS (C) and Joint MSIG, MEMS Substrate, and Material Characterization (TFs) meeting is scheduled for Monday, January 11, 2021 from 10:00-11:30 Pacific. For more information, please visit the Standards Calendar at <http://www.semi.org/standards>.

Tentative Schedule:

10:00-11:30 Joint MSIG, MEMS Substrate, and Material Characterization (TFs) and MEMS / NEMS (C)

Adjournment: 11:24.

Respectfully submitted by:

Laura Nguyen

Sr. Coordinator, International Standards

SEMI Global Headquarters

Phone: +1.408.943.7019

Email: lnguyen@semi.org

Minutes tentatively approved by:

| | |
|--|-----------------|
| Steve Martell (Nordson SONOSCAN), Co-chair | <Date approved> |
| Michelle Bourke (Lam Research), Co-chair | <Date approved> |

Minutes officially approved by: **MEMS NA OVTCCM on July 14, 2021.**

Table 13 Index of Available Attachments^{#1}

| <i>Title</i> | <i>Title</i> |
|--|---|
| Required Element Nov 2020 Rev1 | MEMS ballot summary cycle 6-2020 |
| [2019Fall] MEMS NEMS Meeting Minutes FINAL | 6007_Ballot Review |
| Staff Report Nov 2020_MEMS NEMS | TFOF_MEMS and Miniaturized Gas Sensing Task Force |

#3 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 Laura Nguyen at the contact information above.