



MEMS/NEMS North America TC Chapter

Meeting Summary and Minutes

SEMI Standards NA Fall Meetings 2024

Thursday, November 7, 09:00 – 11:00 Pacific

SEMI Global Headquarters, Milpitas, California, and via Official Virtual TC Chapter Meeting (OVTCCM)

TC Chapter Announcements

Next TC Chapter Meeting

SEMI Standards NA Winter Meetings 2025

Thursday, February 27, 09:00 – 11:00 Pacific

SEMI Global Headquarters, Milpitas, California

Table 1 Meeting Attendees

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

SEMI Staff: Laura Nguyen

<i>Company</i>	<i>Last</i>	<i>First</i>	<i>Company</i>	<i>Last</i>	<i>First</i>
<i>Camenzind Solutions</i>	<i>Camenzind</i>	<i>Mark</i>	<i>SoftMEMS LLC</i>	<i>Maher</i>	<i>Mary Ann</i>
<i>Lam Research</i>	<i>Bourke</i>	<i>Michelle</i>			
<i>Nordson SONOSCAN</i>	<i>Martell</i>	<i>Steve</i>	SEMI	Brosnihan	Tim
<i>Okmetic</i>	<i>Santala</i>	<i>Petri</i>	SEMI	Nguyen	Laura

Table 2 Leadership Changes

None

Table 3 Committee Structure Changes

None

Table 4 Ballot Results

<i>Document #</i>	<i>Document Title</i>	<i>Committee Action</i>
7150	New Standard: Guide to MEMS Manufacturing Readiness Levels	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 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>
7150	SNARF	MEMS Reliability TF	New Standard: Guide to MEMS Manufacturing Readiness Levels – Approved by GCS on 09/15/2023
7150	Ballot Authorization	MEMS Reliability TF	New Standard: Guide to MEMS Manufacturing Readiness Levels – Approved by GCS on 09/03/2024

Table 6 Authorized Activities

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

#	Type	SC/TF/WG	Details
7304	SNARF	NA MEMS / NEMS TC	SEMI MS1-0307 (Reapproved 0318), Guide to Specifying Wafer-Wafer Bonding Alignment Targets
7305	SNARF	NA MEMS / NEMS TC	SEMI MS10-0912 (Reapproved 0318), Test Method to Measure Fluid Permeation Through MEMS Packaging Materials
7306	SNARF	MEMS Microfluidics	SEMI MS11-0318, Specification for Microfluidic Port and Pitch Dimensions

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

Listing of documents authorized by the Originating TC Chapter for Letter Ballot.

#	When	TF	Details
7304	Cycle 9-2024	NA MEMS / NEMS TC	SEMI MS1-0307 (Reapproved 0318), Guide to Specifying Wafer-Wafer Bonding Alignment Targets
7305	Cycle 9-2024	NA MEMS / NEMS TC	SEMI MS10-0912 (Reapproved 0318), Test Method to Measure Fluid Permeation Through MEMS Packaging Materials
7306	Cycle 9-2024	MEMS Microfluidics	SEMI MS11-0318, Specification for Microfluidic Port and Pitch Dimensions

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

None

Table 9 SNARF(s) Canceled

None

Table 10 Standard(s) to receive Inactive Status

Standard Designation	Title
SEMI MS3-0915	Terminology for MEMS Technology

NOTE 1: *Inactive, adj.* — Status of a Standard or Safety Guideline that is not currently supported by the GTC. [Regulations ¶ 4.2.19]

Table 11 New Action Items

Item #	Assigned to	Details
2024Nov#01	SEMI, MSIG	How to increase participants in SEMI Standards, WGs, WG meeting, and to other events?

Table 12 Previous Meeting Action Items

Item #	Assigned to	Details
2021Dec#01	Steve Martell	Provide Laura N. a list of MEMS/Sensors conferences/symposium to potentially present a MSIG WGs and SEMI Standards Update. Ongoing.



1 Welcome, Reminders, and Introductions

Steve Martell (Nordson SONOSCAN), called the meeting to order at 09:05 Pacific. The meeting reminders on antitrust issues, intellectual property issues and holding meetings with international attendance were reviewed. Attendees introduced themselves.

Attachment: SEMI Standards Required Elements

2 Review of Previous Meeting Minutes

The TC Chapter reviewed the minutes of the previous meeting.

Motion: To accept the previous meeting minutes (from SEMICON West 2021 in December) 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: [2021Dec] MEMS NEMS NA TC Chapter Meeting Minutes draft

3 Liaison Reports

3.1 SEMI Staff Report

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

SEMI Global 2024 Calendar of Events

- SEMCON West (July 9-11; San Francisco, CA)
- SEMICON Taiwan (Sept 4-6; Taipei, Taiwan)
- SEMICON India (Sept 11-13; New Delhi, India)
- Energy Taiwan/X Net-Zero Taiwan (Oct 2-4; Taipei, Taiwan)
- SEMICON Europa (Nov 12-15; Munich, Germany)
- SEMICON Japan (December 11-13; Tokyo, Japan)

Global Standards Summit 2024: *Innovating Tomorrow: Standards for Future Factories*

- Inaugural SEMI Event @ SEMICON Japan 2024
 - Thursday, December 12 | 10:30 AM to 4:30 PM, Tokyo Big Sight, Conference Tower, Room 606
- Objective: Identify standards-critical areas and work towards an industry standardization strategy for the next 3- and 7-year time horizons.
- Session Topics:
 - Smart Manufacturing for Future Factories
 - Packaging Architectures & Materials
 - Environmental Sustainability
- Why Attend?
 - Learn – Hear issues critical to the future advancements of semiconductor manufacturing, what’s happening to address them, as well as the standards needed to help enable.
 - Influence – Contribute to the direction of standards development by providing inputs to help optimize future factories.
 - Network – Organized networking events with other stakeholders from suppliers to solution providers to end customers.



- Discover – Explore what SEMICON Japan has to offer (e.g., Sessions on AI & Data, Sustainability, Manufacturing, Integration of Front & Back-end; Standards Meetings)

SEMICON West 2025-2030 ← **NEW!**

- **2025—October 7-9 | Phoenix Convention Center | Phoenix, AZ**
- 2026—October 13-15 | Moscone Center | San Francisco, CA
- **2027—October 12-14 | Phoenix Convention Center | Phoenix, AZ**
- 2028—October 10-12 | Moscone Center | San Francisco, CA
- **2029—October 9-11 | Phoenix Convention Center | Phoenix, AZ**
- 2030—October 29-31 | Moscone Center | San Francisco, CA

Europe Standards Meetings @ SEMICON Europa 2024

- November 12-14, 2024
- ICM (Internationales Congress Center München)
 - Meeting Room: Staffelsee (Mezzanine Level)
- TCs: Silicon Wafer, Gases, Liquid Chemicals, Compound Semiconductor Materials, ERSC

Upcoming NA Meetings 2025

- NA Standards Winter Meetings: February 24-27, 2025, at SEMI HQ, Milpitas, California/USA
- NA Standards Summer Meetings: June 2-6, 2025 (*tentative*), at SEMI HQ, Milpitas, California/USA
- SEMICON West: Oct 6-9, 2025, at Phoenix Convention Center, Phoenix, Arizona/USA

Critical Dates for SEMI Standards Ballots

- Cycle 8-2024: Ballot Submission Due: Oct 1/Voting Period: Oct 15 – Nov 14
- Cycle 9-2024: Ballot Submission Due: Nov 8/Voting Period: Nov 22 – Dec 23
- Cycle 1-2025: Ballot Submission Due: Dec 17, 2024/Voting Period: Jan 8 – Feb 7
- Cycle 2-2025: Ballot Submission Due: Jan 23/Voting Period: Feb 11 – Mar 13
- Cycle 3-2025: Ballot Submission Due: Mar 5/Voting Period: Mar 19 – Apr 18
- Cycle 4-2025: Ballot Submission Due: Mar 20/Voting Period: Apr 9 – May 9
- Cycle 5-2025: Ballot Submission Due: May 8/Voting Period: May 28 – June 27
- Cycle 6-2025: Ballot Submission Due: June 19/Voting Period: July 9 – Aug 8
- Cycle 7-2025: Ballot Submission Due: July 24/Voting Period: Aug 13 – Sep 12

<https://www.semi.org/en/collaborate/standards/ballots>

Standards Publications Report

<i>Cycle</i>	<i>New</i>	<i>Revised</i>	<i>Reapproved</i>	<i>Withdrawn</i>
July 2024	2	5	0	0
August 2024	0	5	4	0
September 2024	0	9	5	0
October 2024	2	1	0	0

Total in portfolio – 1,092 (includes 349 Inactive Standards)

New Standards

<i>Cycle</i>	<i>Designation</i>	<i>Title</i>	<i>Committee</i>	<i>Region</i>
July 2024	SEMI D85	Guide for the Tone Reproduction Curves for Transparent Displays	FPD - Metrology	TW
July 2024	SEMI FH4	Test Method and Guide for the Tactile Characteristics of Flexible Hybrid Electronics Materials and Products	Flexible Hybrid Electronics	JA
October 2024	SEMI E191	Specification for Computing Device Cybersecurity Status Reporting	Information & Control	NA



October 2024	SEMI E191.1	Specification for SECS-II Protocol for Computing Device Cybersecurity Status Reporting to Specification for Computing Device Cybersecurity Status Reporting	Information & Control	NA
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Regulations & Procedure Manual Updates

- *Regulations* (Feb 20, 2024)
 - New definition of “Standards Document”
 - Clarification of confidential presentation materials
 - <https://www.semi.org/sites/semi.org/files/2024-02/Standards%20Regulations%20February%2020%202024.pdf>
- *Procedure Manual* (Feb 20, 2024)
 - The use of Connect@SEMI for TF management and document development depository (next slide)
- *Procedure Manual* (Sept 27, 2024) **New!**
 - Clarification of § 6.4.5.10 for discharging of a TF
 - New ¶ 6.4.5.11 Designation of a TF as Dormant.
 - <https://www.semi.org/sites/semi.org/files/2024-09/Procedure%20Manual%20September%2027%2C%202024.pdf>

Connect@SEMI Communities for all SEMI Standards Task Forces

- By Feb 2025, all Standards Task Forces shall use Connect@SEMI to host documents that are currently in development.
- Each Standards Task Force will have its own Community Page on Connect@SEMI.
- All program members may log in at: <https://connect.semi.org>
 - Enter their username and password (same as program membership log-in)
 - Contact staff if questions.
- Training materials are available at: <https://www.semi.org/standards>
 - Under Standards Developer Resources → Collaboration Tools (scroll to the bottom)

SEMIViews 4.0 – Available Now! {refer to attachment graphics}

- New SEMIViews platform launched on August 19, 2024.
- SEMIViews 4.0 Features include:
 - Upgraded user interface, Improved company user administration functions
 - Dynamic landing page, including feeds for new and revised Standards, upcoming meetings & events, and a reference center
 - Enhanced search functionality and navigation panel, New SEMI Volumes Library, User defined shortcuts via Collections, Favorites, and now, Bookmarks
- Additional features planned in the pipeline.

Activities Approved via GCS between Meetings

- MEMS Reliability TF
 - SNARF 7150: New Standard: *Guide to MEMS Manufacturing Readiness Levels (Approved by GCS on 09/15/2023)*
 - Ballot Authorization for Doc 7150 (*Approved by GCS on 09/03/2024*)

Five-Year Review {refer to attachment for details}

- SEMI MS3, MS1, MS10, MS11, MS5, MS2, MS12

Staff Contact: Laura Nguyen, Lnguyen@semi.org

Attachment: Staff Report November 2024 v4_MEMS

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 7150 — New Standard: *Guide to MEMS Manufacturing Readiness Levels*

- The ballot passed TC Chapter review as balloted. Refer to the attachment for ballot adjudication.

Attachment: 7150_ProceduralReview

5 Subcommittee and Task Force Reports

The following task forces are currently inactive:

- Packaging TF
- Terminology TF
- Wafer Bond TF

5.1 *Joint MSIG (Manufacturing WG), MEMS Reliability, MEMS Substrate, and MEMS Material Characterization Task Force*

This Task Force has been working on standards development under the MSIG Working Groups. The Task Force approved and balloted a new activity, Doc 7150, New Standard: *Guide to MEMS Manufacturing Readiness Levels*. Refer to § 4 for Ballot Review and adjudication.

5.2 *Joint MSIG (Device WG), MEMS and Miniaturized Gas Sensing Task Force*

There is no update at this time.

5.3 *MEMS Microfluidics Task Force*

There is no update at this time.

6 Old Business

6.1 *Standards Sent to Inactive Status*

Motion: Send MS3 to Inactive Status
By / 2nd: By: Michelle Bourke / Lam Research
Second: Mary Ann Maher / SoftMEMS LLC
Discussion: None.
Vote: 4-0 in favor. Motion passed.

6.2 *Standards Due for Five-year Review*

Motion: Approve Reapproval SNARFs for SEMI MS1, MS10, and MS 11, and authorize for Letter Ballot in Cycle 9-24.
By / 2nd: By: Michelle Bourke / Lam Research
Second: Petri Santala / Okmetic Oy
Discussion: None.
Vote: 5-0 in favor. Motion passed.



7 New Business

7.1 New 3DP&I Activity

Steve Martell (Nordson SONOSCAN) brought this to the Committee. Of note:

- iNEMI RDL Adhesion Strength Measurement Project
 - Current peel testing test methods are designed for and limited to 10mm and wider traces, which mainly used for PCBs.
 - iNEMI has been investigating potential RDL adhesion measurement methods for RDL trace widths 20 microns and smaller to determine the actual adhesion properties associated with these smaller structures. The adhesion properties of the smaller structures is important for HDI, WLP, and PLP designs and modeling.
 - A guide for peel testing of RDL traces and other similar small width traces to determine the adhesion properties of the structure (trace bond to substrate) will be based on knowledge gained during the iNEMI RDL Adhesion project.

8 Next Meeting and Adjournment

8.1 The next meeting is tentatively scheduled for the week of February 24-27, in conjunction with SEMI Standards NA Winter Meetings 2025. Schedule details TBD. Please check www.semi.org/standards for updates.

Tentative Schedule:

- Thursday, February 27,
 - 09:00-11:00, MEMS/NEMS NA TC Chapter

Adjournment: 10:03.

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:

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

Minutes approved by: **MEMS/NEMS NA OVTCCM on February 27, 2025.**

Table 13 Index of Available Attachments^{#1}

<i>Title</i>	<i>Title</i>
SEMI Standards Required Elements	Staff Report November 2024 v4_MEMS
[2021Dec] MEMS NEMS NA TC Chapter Meeting Minutes	7150_ProceduralReview

^{#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 Laura Nguyen at the contact information above.