3D Packaging & Integration North America TC Chapter

Meeting Summary and Minutes

NA Standards Summer Meetings 2024

Monday, July 15, 13:00–14:30 (Pacific) Hybrid

Online and via Official Virtual TC Chapter Meeting (OVTCCM)

TC Chapter Announcements

Next TC Chapter Meeting (tentative)

NA Standards Fall Meetings 2024

Thursday, November 7, 13:00 – 15:00 Pacific

SEMI Global Headquarters, Milpitas, California/USA

Table 1 Meeting Attendees

Co-Chairs: Bill Kerr (Evergreen Enhancement), Chris Moore (Consultant)
SEMI Staff: Laura Nguyen

Company	*Last*	*First*	*Company*	*Last*	*First*
Evergreen Enhancement	*Kerr*	*William*	*Nordson SONOSCAN*	*Martell*	*Steve*
Fritz Tech Consultant	*Fritz*	*Denny*			
Microsoft	*Kumar*	*Amit*	*SEMI*	*Nguyen*	*Laura*

Table 2 Leadership Changes

None

Table 3 Committee Structure Changes

None

Table 4 Ballot Results

Document #	*Document Title*	*Committee Action*
7100	Revision to SEMI 3D4-0915 (Reapproved 0222), Guide for Metrology for Measuring Thickness, Total Thickness Variation (TTV), Bow, Warp/Sori, and Flatness of Bonded Wafer Stacks	**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

#	Type	SC/TF/WG	Details
7100	Ballot Authorization	3DP&I Inspection and Metrology TF	Revision to SEMI 3D4-0915 (Reapproved 0222), Guide for Metrology for Measuring Thickness, Total Thickness Variation (TTV), Bow, Warp/Sori, and Flatness of Bonded Wafer Stacks ***– Authorized to ballot in Cycle 4-2024; Approved 04/11/2024***

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
7286	SNARF	3DP&I Bonded Wafer Stacks TF	Reapproval of SEMI 3D21-1019, Guide for Describing Glass-Based Material for Use in 3DS-IC Process

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
7286	Cycle 6 or 7-2024	3DP&I Bonded Wafer Stacks TF	Reapproval of SEMI 3D21-1019, Guide for Describing Glass-Based Material for Use in 3DS-IC 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

None

Table 12 Previous Meeting Action Items

None

1 Welcome, Reminders, and Introductions

Steve Martell (Nordson SONOSCAN) called the meeting to order at 13:07 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 March 2024

2 Review of Previous Meeting Minutes

The TC Chapter reviewed the minutes of the previous meeting.

Motion:	Approve the minutes as written.
By / 2nd:	By: Steve Martell / Nordson SONOSCAN Second: Dennis Fritz / Fritz Technology Consulting
Discussion:	None.
Vote:	3-0 in favor. Motion passed.

Attachment: [2023Fall] 3DP&I NA TC Chapter Meeting Minutes

3 Liaison Reports

3.1 *3D Packaging & Integration Japan TC Chapter*

Laura Nguyen (SEMI HQ) reported for the Japan TC Chapter. Of note:

Meeting Information

- Last meeting: Thursday, May 23, 2024, OVTCCM/ SEMI Japan, Tokyo, Japan (Hybrid)
- Next meeting: Monday, October 28, 2024, OVTCCM/ SEMI Japan, Tokyo, Japan (Hybrid)

Leadership Changes

WG/TF/SC/TC Name	Previous Leader	New Leader
Wafer Bond Strength Measurement by Double-cantilever Beam TF	--	Fumihiro Inoue/ Yokohama National University Marie Sano/ Yokohama National University

Committee Structure Changes

Previous TF/SC/CFG Name	New TF/SC/CFG Name or Status Change
Panel Level Packaging (PLP) Glass Carrier TF	Disbanded
Wafer Bond Strength Measurement by Double-cantilever Beam TF	Newly formed

Refer to the attachment for Org Chart

Ballot Results: None

Authorized Activities

#	Type	SC/TF/WG	Document Title/Details
7252	SNARF	3D Packaging & Integration 5-Year Review TF	Reapproval of SEMI 3D19-0619, Test Method for Adhesive Strength of Adhesive Tray Used for Thin Chip Handling
7253	SNARF	3D Packaging & Integration 5-Year Review TF	Reapproval of SEMI G96-1014 (Reapproved 1019), Test Method for Measurement of Chip (Die) Strength by mean of Cantilever Bending

Authorized Ballots

#	When	TF	Document Title/Details
7252	Cycle 6	3D Packaging & Integration 5-Year Review TF	Reapproval of SEMI 3D19-0619, Test Method for Adhesive Strength of Adhesive Tray Used for Thin Chip Handling
7253	Cycle 6	3D Packaging & Integration 5-Year Review TF	Reapproval of SEMI G96-1014 (Reapproved 1019), Test Method for Measurement of Chip (Die) Strength by mean of Cantilever Bending

Five-Year Review

Designation#	Standard Title	Action By	Assigned to
SEMI 3D19-0619	Test Method for Adhesive Strength of Adhesive Tray Used for Thin Chip Handling	SNARF submitted	3D Packaging & Integration 5-Year Review TF
SEMI G96-1014 (Reapproved 1019)	Test Method for Measurement of Chip (Die) Strength by mean of Cantilever Bending	SNARF submitted	3D Packaging & Integration 5-Year Review TF

Task Force Highlights

- Panel Level Packaging (PLP) Glass Carrier TF
  - Disbanded as the TF completed its mission.
  - Doc.#6590, New Standard: Specification for Glass Carrier Characteristics for Panel Level Packaging (PLP) Applications was published as 3D23-0721.
- 3DS IC Bonded Layer Inspection Metrology TF
  - Co-leaders: Haruo Shimamoto/ AIST, Shigeru Ohno/ Hitachi Power Solutions
  - Developing “Guide” Standard for detecting defects on the interfaces between layers of 3D stackedIC.
  - SNARF was sent to the 3D Packaging and Integration Global Technical Committee members for two weeks review.
    - SNARF will be proposed to the next TC Chapter meeting.
- Wafer Bond Strength Measurement by Double-cantilever Beam Task Force
  - Co-leaders: Fumihiro Inoue/ Yokohama National University, Marie Sano/ Yokohama National University
    - Looking for another TF co-leader from another company/ organization.
  - Newly formed in January 2024
    - The wafer bonding process is maturing and being utilized for a wide variety of semiconductor processes. Bonding is typically assessed through "adherence energy (also known as bond strength)," with the energy evaluated using the double cantilever beam (DCB) test. While this test is widely used in the semiconductor field, there is currently no standardized method for measurement. As a result, measured values exhibit significant variation even within a wafer. Furthermore, these values are not comparable.
    - The objective of the TF is to minimize this variation and establish an industrial standard for bond strength measurement as well as the values for process qualification.
  - Kickoff meeting was held on May 16 and over 20 members.
    - Called for more participants from device makers as well as global participants like CEA-Leti and IMEC.
  - Next TF meeting will be held on August 1 where the very first draft document will be presented.
- Five Years Review TF
  - Reapproval SNARFs were approved.
    - SEMI 3D19-0619, Test Method for Adhesive Strength of Adhesive Tray Used for Thin Chip Handling
    - SEMI G96-1014 (Reapproved 1019), Test Method for Measurement of Chip (Die) Strength by mean of Cantilever Bending
  - Ballots will be submitted for Cycle 6 and will be adjudicated at the next TC Chapter meeting in October.
    - Doc.#7252, Reapproval of SEMI 3D19-0619, Test Method for Adhesive Strength of Adhesive Tray Used for Thin Chip Handling

- Doc.#7253, Reapproval of SEMI G96-1014 (Reapproved 1019), Test Method for Measurement of Chip (Die) Strength by mean of Cantilever Bending

- 3D Packaging & Integration Steering Group WG
  - Planed and successfully held Workshop on Packaging Standards at SEMICON Japan 2023
  - To raise awareness regarding SEMI standards activities and recruit new members.
  - 165 people participated.
  - https://www.semiconjapan.org/en/programs/2023-pb01

Staff Contact: Akiko Yoshida at ayoshida@semi.org

Attachment: JA 3DP&I_Liaison Report_July 2024_R2_LNN

3.2 *3D Packaging & Integration Taiwan TC Chapter (no update since Summer 2022)*

3.3 *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)

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

Upcoming NA Meetings 2024

- NA Standards Fall Meetings: November 4-7, 2024, at SEMI HQ, Milpitas, California/USA

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 6-2024: Ballot Submission Due: July24/Voting Period: Aug 7 – Sept 6
- Cycle 7-2024: Ballot Submission Due: Aug 27/Voting Period: Sept 10 – Oct 10
- 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

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

Standards Publications Report

Cycle	*New*	*Revised*	*Reapproved*	*Withdrawn*
March 2024	0	6	8	0
April 2024	1	7	2	0
May 2024	3	7	1	2
June 2024	0	12	1	0

Total in portfolio – 1,088 (includes 342 Inactive Standards)

New Standards

Cycle	*Designation*	*Title*	*Committee*	*Region*
April 2024	SEMI T25	Specification for ID Marking for Glass Carrier Characteristics of Panel Level Packaging (PLP) Applications	Traceability	JA
May 2024	SEMI E189	Specification for Equipment Management of Consumables and Durables (EMCD)	Information & Control	NA
May 2024	SEMI E189.1	Specification for SECS-II Protocol for Equipment Management of Consumables and Durables (EMCD)	Information & Control	NA
May 2024	SEMI D86	Test Method for Flicker Nuisance of Wide-Visual-Field Displays	FPD - Metrology	TW

The Use of Connect@SEMI for TF Management and Document Development Depository

- Refer to PM § 6.4.5 Operation of TFs
  - Task Forces have one year from 02/20/25 to implement use of Connect@SEMI. (https://connect.semi.org)
- Once TFs have implemented use of Connect@SEMI, they shall use it to:
  - Maintain the TF member roster up to date.
  - Share the working drafts.
    - The default format for working Draft Document sharing shall be Adobe Acrobat PDF.
  - Distribute the Draft Document at least one week before ballot submission to SEMI.
- All existing TFs have been set up in Connect@SEMI as Communities with the TF leaders assigned community admin and moderator capabilities
- Training materials for TF leaders and members (users) are available at
  - https://www.semi.org/standards
    - Under Standards Developer Resources → Collaboration Tools (scroll to the bottom)

Productive Committee Member Guidelines*{refer to attachment for slide}*

- At the NA Spring 2024 meetings, the NARSC agreed to distribute a slide on Productive Committee Member Guidelines for use among the various TC chapters
- While not part of the Required Meeting Elements, TC Chapters are encouraged to present this slide to encourage effective standards development while being considerate of the volunteer nature of the Program.
- The Productive Committee Member Guidelines will be offered to TC Chapters starting with the SEMICON West 2024 meetings and subsequently to the other regions.

SEMIViews 4.0 – Coming Soon! *{refer to attachment graphics}*

- New or improved features include:
    - Improved search functionality and navigation panel
    - New custom Library feature
    - User defined shortcuts using Collections, Favorites, and Bookmarks
    - Improvements for account admin functions
    - A more dynamic landing page with feeds on new & revised Standards, upcoming meetings & events as well as help & resource center
    - Refreshed user interface
- In progress
    - Incorporating feedback from customer/user beta testing
    - Beta testing with select SEMIViews account admins
    - New SEMIViews platform planned for launch on August 5, 2024.

Activities Approved by GCS

- 7100: Revision to SEMI 3D4-0915 (Reapproved 0222), Guide for Metrology for Measuring Thickness, Total Thickness Variation (TTV), Bow, Warp/Sori, and Flatness of Bonded Wafer Stacks
    - Ballot authorization for Cycle 4-2024; approved 04/11/2024

Five-Year Review:

Designation #	Standard Title	Action By	Assigned to
SEMI 3D1-0519	Terminology for Through Silicon via Geometrical Metrology	Spring 2024	Inspection and Metrology
SEMI 3D21-1019	Guide for Describing Glass-Based Material for Use in 3DS-IC Process	Summer 2024	Bonded Wafer Stacks
SEMI 3D22-1219	Guide on Measurements of Openings and Vias in Glass	Winter 2024	Inspection and Metrology
SEMI 3D11-1214 (Reapproved 0420)	Terminology for Through Glass Via and Blind Via in Glass Geometrical Metrology	Spring 2025	Inspection and Metrology
SEMI 3D10-0814 (Reapproved 0420)	Guide to Describing Materials Properties for Intermediate Wafers for Use in a 300 mm 3DS-IC Wafer Stack	Spring 2025	Bonded Wafer Stacks
SEMI 3D9-0914 (Reapproved 0420)	Guide for Describing Materials Properties for a 300 mm 3DS-IC Wafer Stack	Spring 2025	Bonded Wafer Stacks

Attachment: Staff Report July 2024 v5_3DP&I

- Proposed by Committee Chair to send for Reapproval Ballot

Motion: Approve the Reapproval SNARF and Authorize the Document for Letter Ballot SEMI 3D21-1019, Guide for Describing Glass-Based Material for Use in 3DS-IC Process for Cycle 6 or 7, 2024.

By / 2nd: By: Steve Martell / Nordson SONOSCAN
Second: Dennis Fritz / Fritz Technology Consulting

Discussion: None.

Vote: 3-0 in favor. Motion passed.

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 file name for each balloted document is provided under each ballot review section below.

4.1 Document # 7100, Revision to SEMI 3D4-0915 (Reapproved 0222), Guide for Metrology for Measuring Thickness, Total Thickness Variation (TTV), Bow, Warp/Sori, and Flatness of Bonded Wafer Stacks

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

Attachment: 7100_ProceduralReview

5 Subcommittee and Task Force Reports

5.1 *Panel Level Packaging (PLP) Panel Task Force – did not meet*

The PLP Panel TF did not meet at Fall 2023 Meetings. Of note, there are no planned meetings on the 2024 calendar. The TF leader continues to liaise with the PIC PLP activities to ensure both documents don't overlap and complement each other.

5.2 *3DP&I Inspection & Metrology and Bonded Wafer Stacks Task Force*

Task Force Leader Steve Martell (Nordson SONOSCAN) reported for both the 3DP&I Inspection & Metrology and 3DP&I Bonded Wafer Stacks Task Forces.

Of note, the TF did not meet and had one ballot to review. Refer to § 4 for results.

Motion:	Authorize the Document 7100 for Letter Ballot in Cycle 1 or 2-24: Revision to SEMI 3D4-0915 (Reapproved 0222), Guide for Metrology for Measuring Thickness, Total Thickness Variation (TTV), Bow, Warp/Sori, and Flatness of Bonded Wafer Stacks
By / 2nd:	By: Mark Biedrzycki / ThermoFisher Scientific Second: Mark Takahashi / retired
Discussion:	None.
Vote:	5-0 in favor. Motion passed.

6 Old Business

None

7 New Business

None

8 Action Item Review

None

9 Next Meeting and Adjournment

9.1 The next meeting is tentatively scheduled for the week of November 4-7, in conjunction with SEMI Standards NA Fall Meetings 2024. Schedule details TBD. Please check www.semi.org/standards for updates.

Tentative Schedule:

- Thursday, November 7
  - TBD, Panel Level Packaging (PLP) Panel TF
  - 11:00-12:00, Joint 3DP&I Bonded Wafer Stacks Task Force, and 3DP&I Inspection & Metrology Task Force
  - 13:00-14:30, 3DP&I NA TC Chapter

Adjournment: 14:06.

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:

Bill Kerr (Evergreen Enhancement), Co-chair	<Date approved>
Chris Moore (Consultant), Co-chair	<Date approved>

Minutes approved by: **3DP&I NA OVTCCM on XXXX.**

Table 13 Index of Available Attachments[#1]

Title	*Title*
SEMI Standards Required Elements March 2024	Staff Report July 2024 v5_3DPI
[2023Fall] 3DP&I NA TC Chapter Meeting Minutes	7100_ProceduralReview
JA 3DP&I_Liaison Report_July 2024_R2_LNN	

#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.