3D Packaging & Integration North America TC Chapter

Meeting Summary and Minutes

SEMICON West 2023

Thursday, July 13, 13:00 – 14:30 Pacific

Moscone Center, San Francisco, California/USA, and via Official Virtual TC Chapter Meeting (OVTCCM)

TC Chapter Announcements

Next TC Chapter Meeting

NA Standards Fall Meetings 2023

Thursday, November 9, 13:00–14:00 (Pacific) Hybrid

SEMI Global Headquarters, Milpitas, California

Table 1 Meeting Attendees

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

Company	*Last*	*First*	*Company*	*Last*	*First*
Corning	*Schmidt*	*Ilona*	*Thermo Fisher Scientific*	*Biedrzycki*	*Mark*
Evergreen Enhancement	*Kerr*	*Bill*			
Nordson SONOSCAN	Martell	Steve	SEMI	Nguyen	Laura

Table 2 Leadership Changes

None

Table 3 Committee Structure Changes

None

Table 4 Ballot Results

None

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

None

Table 6 Authorized Activities

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

None

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

None

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

Bill Kerr (Evergreen Enhancement), called the meeting to order at 13:11 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 (File name: Required Element Nov 2020 Rev1)

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: william kerr / Evergreen Enhancement, Inc.
Discussion:	None.
Vote:	4-0 in favor. Motion passed.

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

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: Wednesday, June 21, 2023 online via OVTCCM
- Next meeting: Tuesday, September 5, 2023 online via OVTCCM

Committee Structure Change

- Disband the TFOF Encapsulation Characteristics for Wafer Level Package and Panel Level Packaging Task Force

See attachment for Org Chart

Ballot Results

Doc#	***Document Title***	***TC Chapter Action***
6994	Reapproval of SEMI G89-0211 (Reapproved 0318) Specification for Leadframe Strip Size	**Passed as balloted**
6995	Reapproval of SEMI G71-0996 (Reapproved 0318) Specification for Barcode Marking of Intermediate Containers for Packaging Materials	**Passed as balloted**
6996	Reapproval of SEMI G69-0996 (Reapproved 0318): Test Method for Measurement of Adhesive Strength Between Leadframes and Molding Compounds	**Passed as balloted**
6997	Reapproval of SEMI G90-0811 (Reapproved 0318): Specification for 300 mm Wafer Coin-Stack Type Shipping Container Used for Test and Packaging Processes	**Passed as balloted**
6998	Reapproval of SEMI G66-96 (Reapproved 0318):Test Method for the Measurement of Water Absorption Characteristics for Semiconductor Plastic	**Passed as balloted**
6999	Reapproval of SEMI G23-0996 (Reapproved 0318): Test Method of Inductance for Internal Traces of Semiconductor Packages	**Passed as balloted**

Task Force Highlights

- Encapsulation Characteristics for Wafer Level Package and Panel Level Packaging TF
    - Several comments including rejection were received from the voters. These comments were reviewed and to re-ball the updated documents to Cycle2-2022.
    - 7 These Ratification Ballot are also passed A&R in May 2022.
        - Publish these 7 standards documents in October 2023
        - #6706 - New Standard: Specification for CTE and Tg Measurement Methodology for PLP/WLP Encapsulation Materials
        - #6707 - New Standard: Specification for Flowability Measurement Methodology for PLP/WLP Encapsulation materials
        - #6708 - New Standard: Specification for Gel Time Measurement Methodology for PLP/WLP Encapsulation materials
        - #6709 - New Standard: Specification for Modulus Measurement Methodology for PLP/WLP Encapsulation materials
        - #6710 - New Standard: Specification for Shear Strength Measurement Methodology for PLP/WLP Encapsulation Materials
        - #6711 - New Standard: Specification for Viscosity Measurement Methodology for PLP/WLP Encapsulation materials
        - #6712 - New Standard: Specification for Wettability Measurement Methodology for PLP/WLP Encapsulation materials
    - Disbanded on March 15, 2023
- Five Years Review TF
    - Activities Overview:
        - 5yrs Documents Review Status:
        - See next page for the review required list.
        - 6 ballots were approved by clean at 2023-Cy2. June-20 TC meeting will review these letters of ballots.
        - 2 remained documents are now under voting at 2023-Cy5.
    - Next Step:
        - No documents left for reviews in 2023.
        - Will start the reviews next year.

    - Five-Year Table Progress

1	Document #	Doc. Title	Action	Remarks
1	SEMI G89-0211 (Reapproved 0318)	Specification for Leadframe Strip Size	Reapproval	**2023-Cy2 Approved.**
2	SEMI G71-0996 (Reapproved 0318)	Specification for Barcode Marking of Intermediate Containers for Packaging Materials	Reapproval	**2023-Cy2 Approved.**
3	SEMI G69-0996 (Reapproved 0318)	Test Method for Measurement of Adhesive Strength Between Leadframes and Molding Compounds	Reapproval	**2023-Cy2 Approved.**
4	SEMI G68-0996 (Reapproved 0318)	Test Method for Junction-to-Case Thermal Resistance Measurements in Air Environment for Semiconductor Packages	INACTIVE	
5	SEMI G67-0996 (Reapproved 0318)	Test Method for the Measurement of Particle Generation from Sheet Materials	INACTIVE	
6	SEMI G90-0811 (Reapproved 0318)	Specification for 300 mm Wafer Coin-Stack Type Shipping Container Used for Test and Packaging Processes	Reapproval	**2023-Cy2 Approved.**
7	SEMI G66-96 (Reapproved 0318)	Test Method for the Measurement of Water Absorption Characteristics for Semiconductor Plastic Molding Compounds	Reapproval	**2023-Cy2 Approved.**
8	SEMI G65-0318	Test Method for Evaluation of Leadframe Materials Used for L-Leaded (Gull Wing Type) Packages	INACTIVE	
9	SEMI G62-0318	Test Method for Silver Plating Quality	INACTIVE	
10	SEMI G60-94 (Reapproved 0318)	Test Method for the Measurement of Electrostatic Properties of Semiconductor Leadframe Interleafing Materials	INACTIVE	
11	SEMI G59-94 (Reapproved 0318)	Test Method for Measurement of Ionic Contamination on Leadframe Interleafing and the Contamination Transferred from the Interleafing to the Leadframes	INACTIVE	
12	SEMI G56-0318	Test Method for Measurement of Silver Plating Thickness	INACTIVE	
13	SEMI G42-0996 (Reapproved 0318)	Specification for Thermal Test Board Standardization for Measuring Junction-to-Ambient Thermal Resistance of Semiconductor Packages	INACTIVE	
14	SEMI G38-0318	Test Method for Still- and Forced-Air Junction-to-Ambient Thermal Resistance Measurements of Integrated Circuit Packages	INACTIVE	
15	SEMI G23-0996 (Reapproved 0318)	Test Method of Inductance for Internal Traces of Semiconductor Packages	Reapproval	**2023-Cy2 Approved.**
16	SEMI G18-0318	Specification for Integrated Circuit Leadframe Material Used in the Production of Etched Leadframes	INACTIVE	
17	SEMI G94-0113	Specification for Coin-Stack Type Tape Frame Shipping Container for 300 mm Wafer	Reapproval	**Ballot submitted to 2023-Cy5**
18	SEMI G64-1118	Specification for Full-Plated Integrated Circuit Leadframes (Au, Ag, Cu, Ni, Pd/Ni, Pd)	Reapproval	**Ballot submitted to 2023-Cy5**

- 3DS IC Bonded Layer Inspection Metrology TF
    - In process of tested inspection ability study for bonded layer inspection of 2nd trial sample is undergoing at two measurement sites.
    - Also, under study whether current ID mark at each layer can be detectable through the inspection.
    - Draft version of guideline is under preparation.
- 3D Packaging & Integration Steering Group WG
    - Proposed to decide the direction of future activities by the next committee meeting.
    - Expects to call for the Steering Group members via SEMI newsletters and workshop.
- Panel Level Packaging (PLP) Glass Carrier TF
    - Ballot 6590, New Standard: Specification for Glass Carrier Characteristics for Panel Level Packaging (PLP) Applications
    - Published as 3D023-0721 in July 2021
    - Panel Level Packaging (PLP) Glass Carrier ID Marking TF established under Traceability TC

Five Year Review

Designation#	***Standard Title***	***Action By***	***Assigned to***
SEMI G94-0113	Specification for Coin-Stack Type Tape Frame Shipping Container for 300 mm Wafer	11/2023	3D Packaging & Integration 5 Year Review Task Force
SEMI G64-1118	Specification for Full-Plated Integrated Circuit Leadframes (Au, Ag, Cu, Ni, Pd/Ni, Pd)	11/2023	3D Packaging & Integration 5 Year Review Task Force

Staff Contact: Mami Nakajo, mnakajo@semi.org

Attachment: JA 3DP&I TC Chapter Liaison Report June 2023_r0

3.2 *3D Packaging & Integration Taiwan TC Chapter*

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

Meeting Information

- Last meeting: September 2, 2022 at the SEMI Standards Taiwan Summer 2022 Meetings, online via OVTCCM
- Next meeting: TBD

Leadership

- Co-chairs
  - Wei-Chung Lo – ITRI
  - Wendy Chen - KYEC
  - Roger Hwang – ASE Group

See attachment for Org Chart

Task Force Highlights

- Testing Task Force
  - #6921 New Standard: Guide for Adding Maximum Allowable Current (MAC) Information for Wafer Testing Probe in the TC Meeting.
    - To update the draft status
    - New members request for the Testing Task Force
- Middle End Process Task Force
  - New members request for the CMP Standard for hybrid bonding New Topic.

Staff Contact: Cher Wu, cherwu@semi.org

Attachment: 3D P&I TW Liaison Report_20220902_v1

3.3 *SEMI Staff Report*

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

SEMI Global 2023 Calendar of Events

- SEMICON West (July 11-13; San Francisco. CA)
- SEMICON Taiwan (Sept 6-8; Taipei, Taiwan)

- SEMICON Europa (Nov 14-17; Munich, Germany)
- SEMICON Japan (Dec 13-15; Tokyo, Japan)

Upcoming NA Meetings

- NA Fall Meetings
    - November 6-9, 2023, at SEMI Headquarters in Milpitas, CA
- NA Spring Meetings
    - April 1-4, 2024 (Tentative), at SEMI Headquarters in Milpitas, CA
- SEMICON West Meetings
    - July 2024, at Moscone Center, San Francisco, California/USA

Critical Dates for SEMI Standards Ballots

2023	Ballot Submission Deadline	Voting Opens	Voting Closes
Cycle 6	July 26	August 9	September 8
Cycle 7	August 30	September 13	October 13
Cycle 8	October 4	October 18	November 17
Cycle 9	November 15	November 29	December 29

2023 Cycle dates can be found here: http://www.semi.org/en/Standards/Ballots

New Publications Staff

- Vivian Hoang – Sr. Specialist, Standards Publications
    - Joined SEMI May 17, 2023.
    - Will focus on processing ballots to reduce backlog and improve publishing time.

Regulations and Procedure Manual updates

- Regulations (Feb 28, 2023)
    - Provide publication conditions for both Letter Ballot Review to pass procedural review and its Ratification Ballot is accepted.
        - If the Letter Ballot Review fails procedural review, the acceptance for the Ratification Ballot shall be nullified.
    - https://www.semi.org/sites/semi.org/files/2023-02/Standards%20Regulations%20February%2028%2C%202023.pdf
- Procedure Manual (Feb 28, 2023)
    - Clarification on Line-Item Ballots are only permitted on revisions to already published identified portions of Standards or Safety Guidelines.
    - Revision of any Subordinate Standard causes the Publication Date Code of the Primary Standard to be considered as reapproved and it shall be given the (Reapproved mmyy) designation.
    - Contents of Background Statement Required for Revision of Subordinate/Primary Standard Letter Ballots.
    - https://www.semi.org/sites/semi.org/files/2023-02/Procedure%20Manual%20February%2028%2C%202023.pdf

Standards Publications Report

Cycle	*New*	*Revised*	*Reapproved*	*Withdrawn*
March 2023	2	1	0	0
April 2023	1	10	4	0

May 2023	0	4	2	0
June 2023	1	10	7	0

Total in portfolio – 1,079 (includes 327 Inactive Standards)

New Standards

Cycle	*Designation*	*Title*	*Committee*	*Region*
March 2023	SEMI FH1	Test Method of Line Impedance for Electronic Textiles	Flexible Hybrid Electronics	TW
March 2023	SEMI FH2	Test Method of Sheet Resistance for Woven Electronic Textiles	Flexible Hybrid Electronics	TW
April 2023	SEMI M92	Specification for 4H-SIC Homoepitaxial Wafer	Compound Semiconductor Materials	CH
June 2023	SEMI PV100	Test Method of Wind Uplift Resistance for Photovoltaic Modules Roof (BIPV)	Photovoltaic	CH

SNARFs Approved by GCS (in between TC Chapter Meetings)

#	***Type***	***SC/TF/WG***	***Details***
7099	SNARF/ Ballot Authorization	3DP&I Inspection & Metrology TF	Revision to SEMI 3D3-0613 (Reapproved 1218), Guide for Multiwafer Transport and Storage Containers for 300 mm, Thin Silicon Wafers on Tape Frames ***– Approved by GCS on 05/30/2023***
7100	SNARF/ Ballot Authorization	3DP&I Inspection & 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 ***– Approved by GCS on 05/30/2023***
7101	SNARF/ Ballot Authorization	3DP&I Inspection & Metrology TF	Revision to SEMI 3D5-0314 (Reapproved 1218), Guide for Metrology Techniques to be Used in Measurement of Geometrical Parameters of Through-Silicon Vias (TSVs) in 3DS-IC Structures ***– Approved by GCS on 05/30/2023***
7102	SNARF/ Ballot Authorization	3DP&I Inspection & Metrology TF	Revision to SEMI 3D17-1217, Specification for Reference Material for Bonded Wafer Stack Void Metrology ***– Approved by GCS on 05/30/2023***

Five-Year Review

Designation #	**Standard Title**	**Action By**	**Assigned to**
SEMI 3D1-0519	Terminology for Through Silicon via Geometrical Metrology	05/2024	Inspection and Metrology

Attachment: Staff Report July 2023 v3_3DP&I

4 Ballot Review

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.

4.1 Document # 7099, Revision to SEMI 3D3-0613 (Reapproved 1218), Guide for Multiwafer Transport and Storage Containers for 300 mm, Thin Silicon Wafers on Tape Frames

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

Attachment: 7099_ProceduralReview

4.2 Document # 7102, Revision to SEMI 3D17-1217, Specification for Reference Material for Bonded Wafer Stack Void Metrology

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

Attachment: 7102_ProceduralReview

5 Subcommittee and Task Force Reports

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

Of note, there are upcoming planned meetings. Some new items the TF will possibly look at will include, but not limited to CTE, flow, modulus, shear strength, wettability, etc. The TF leader continues to liaise with the PIC PLP activities to ensure both documents don't overlap and complement each other.

Steve Martell (Nordson SONOSCAN) noted that the PIC Panel FOUP TF in Japan is also doing work on PLP, but does not effect this task force. There are no new updates at this time.

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 reviewed the following standards for reapproval:

- SEMI 3D3-0613 (Reapproved 1218), Guide for Multiwafer Transport and Storage Containers for 300 mm, Thin Silicon Wafers on Tape Frames
- 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 TF will plan to ballot in Cycle 6 or 7-2023.

Motion:	Authorize the Documents below for Letter Ballot in Cycle 6 or 7-2023: • 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 • 7101, Revision to SEMI 3D5-0314 (Reapproved 1218), Guide for Metrology Techniques to be Used in Measurement of Geometrical Parameters of Through-Silicon Vias (TSVs) in 3DS-IC Structures
By / 2nd:	By: Steve Martell / Nordson SONOSCAN Second: william kerr / Evergreen Enhancement, Inc.
Discussion:	None.
Vote:	4-0 in favor. Motion passed.

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

6 Old Business

None

7 New Business

None

8 Action Item Review

8.1 New Action Items are noted in Table 11. Previous action items are noted in Table 12 in 'red' and for recent updates in 'blue'. There is no further business.

9 Next Meeting and Adjournment

9.1 The next meeting is tentatively scheduled for the week of November 6-9, in conjunction with SEMI Standards NA Fall Meetings 2023. Schedule details TBD. Please check www.semi.org/standards for updates.

Tentative Schedule:

- Thursday, November 9
  - TBD, PLP Panel TF
  - 11:00-12:00, Joint 3DP&I Bonded Wafer Stacks Task Force, and 3DP&I Inspection & Metrology Task Force
  - 13:00-14:00, 3DP&I NA TC Chapter

Adjournment: 13:37

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 (Covalent Metrology), Co-chair	<Date approved>

Minutes approved by: **3DP&I NA OVTCCM on July 13, 2023.**

Table 13 Index of Available Attachments[#1]

Title	*Title*
SEMI Standards Required Elements	Staff Report July 2023 v3_3DP&I
[2023Spring] 3DP&I NA TC Chapter Meeting Minutes FINAL	7099_ProceduralReview
JA 3DP&I TC Chapter Liaison Report June 2023_r0	7102_ProceduralReview
3D P&I TW Liaison Report_20220902_v1	

#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.