



Physical Interfaces & Carriers North America TC Chapter

Meeting Summary and Minutes

NA Standards Spring Meetings 2019

Wednesday, April 3, 10:00 – 12:00

SEMI Global Headquarters, Milpitas, California

TC Chapter Announcements

Next TC Chapter Meeting

SEMICON West Standards Meetings 2019

Wednesday, July 10, 10:00 – 12:00

Moscone Center, San Francisco, California

Table 1 Meeting Attendees

Italics indicate virtual participants

Co-Chairs: Matt Fuller (Entegris), Melvin Jung (Intel)

SEMI Staff: Laura Nguyen

| <i>Company</i> | <i>Last</i> | <i>First</i> | <i>Company</i> | <i>Last</i> | <i>First</i> |
|---------------------------------|-------------|--------------|-----------------------------|---------------|--------------|
| Acteon NEXT Corporation | Komatsu | Shoji | <i>Self</i> | <i>Wagner</i> | <i>Peter</i> |
| Entegris | Fuller | Matthew | Shin-Etsu Polymer Co., Ltd. | Shida | Hiroyuki |
| Hitachi High-Technologies Corp. | Onishi | Tsuyoshi | Thermo Fisher Scientific | Kwakman | Laurens |
| JEOL Ltd. | Asayama | Kyoichiro | Tokyo Electron Limited | Mashiro | Supika |
| Intel | Jung | Melvin | UA Associates | Hartsough | Larry |
| Murata Machinery, Ltd. | Tominaga | Tadamasa | 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> |
|-------------------|---|-------------------------|
| 6311 | New Standard: Specification for TEM Lamella Carrier Used in Electron Microscopy Workflows | Failed |

#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

None

Table 6 Authorized Activities

None

Table 7 Authorized Ballots

| # | When | TF | Details |
|-------|---------------|---------------------------------|---|
| 6311A | Cycle 5, 2019 | Electron Microscopy Workflow TF | New Standard: Specification for TEM Lamella Carrier Used in Electron Microscopy Workflows |

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

| Item # | Assigned to | Details |
|--------------|--------------|---|
| 2017April#04 | Laura Nguyen | To identify which documents under the global task force belong to which committees. Ongoing. |

1 Welcome, Reminders, and Introductions

Matt Fuller (Entegris) 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: Larry Hartsough (UA Associates) / Shoji Komatsu (Acteon NEXT)

Discussion: None.

Vote: 10-0 in favor. Motion passed.

Attachment: [2018Fall] PIC NA Minutes FINAL

3 Liaison Reports

3.1 *Physical Interfaces & Carriers Europe TC Chapter*

There is no update at this time. The next PIC Europe TC Chapter will tentatively be held in conjunction with SEMICON Europa 2019.

3.2 *Physical Interfaces & Carriers Japan TC Chapter*

Laura Nguyen (SEMI) reported for the Physical Interfaces & Carriers Japan TC Chapter. Of note:

Meeting Information

- Last meeting
 - December 12 at the Japan Standards Winter 2018 Meetings in conjunction with SEMICON Japan 2018; Tokyo Big Sight
- Next meeting
 - April 18 at the Japan Standards Spring 2019 Meetings; SEMI Japan office, Tokyo, Japan

Leadership

- Committee Co-chairs
 - Tsuyoshi Nagashima (Miraial)
 - GCS voting member, PI&C Committee representative to the JRSC
 - Kenji Yamagata (DAIFUKU)
 - GCS voting member
 - Noriyoshi Toyoda (Hirata Corporation)
- Technical Architect
 - Shoji Komatsu (Acteon NEXT)

Committee Structure Changes

- Fan-Out Panel Level Packaging (FO-PLP) Panel FOUP TF
 - Change TF name to: Panel Level Packaging Panel FOUP TF

Leadership Structure Changes

- 300mm Tape Frame PI&C Task Force
 - Newly appointed TF leader
 - Naomune, Taniguchi (Tokyo Seimitsu)
- Panel Level Packaging Panel FOUP TF
 - Newly appointed TF Leader
 - John Rudolph (Intel)

Current Structure of Japan TC Chapter {See attachment for Org Chart}

Ballot Results {See attachment for detail}

Authorized Activities {See attachment for detail}

Authorized Ballots {See attachment for detail}

Task Force Highlights

300mm Tape Frame PI&C Task Force

- Leaders: Hayato Iwamoto (Sony Semiconductor Solutions), Hisashi Gotoh (Sony Semiconductor Solutions), Masayuki Azuma (Tokyo Seimitsu), Naomune Taniguchi (Tokyo Seimitsu) – newly appointed at the TC Chapter meeting on December 12
- Discussion



- The current Standards for 300 mm interface cannot be applied.
- 300 mm Tape Frame FOUP/Loadport should be newly standardized.
- New SNARFs
 - New Standard - Specification For 300mm Tape Frame Foup
 - New Standard - Specification For 300mm Tape Frame Foup Load Port
 - New Standard - Specification For Front Opening Interface Between 300mm Tape Frame Foup And Load Port
 - New Standard - Specification For Bolts Of 300mm Tape Frame Foup Load Port
 - New Standard - Specification For Indicator Placement Zone And Switch Placement Volume Of 300mm Tape Frame Foup Load Port

Japan Electron Microscopy Workflow Liaison Task Force

- Leadership: Kyoichiro Asayama / JEOL, Tsuyoshi Onishi / Hitachi High-Technologies

Discussion

- Reading/Writing 2-Dimentional ID Code on TEM Lamella Carrier was experimented and its suggestion was made at teleconference in Feb 2019.

Panel Level Packaging Panel FOUP Task Force

- Leader: Shoji Komatsu (Acteon NEXT), John Rudolph (Intel) – newly appointed at the TC Chapter meeting on December 12)
- TFOF revised at the TC Chapter meeting on December 12
- Charter
 - This TF will focus on the development on Panel FOUP and related physical interface standards for Panel Level Packaging utilizing existing SEMI 450mm standards.
- The target panel size is assumed as follows;
 - Width 500~650mm x Depth 500~650mm
- New SNARFs approved at the TC Chapter meeting on December 12
 - 6485: New Standard: Specification for Panel FOUP For Panel Level Packaging
 - 6486: New Standard: Specification for Panel FOUP Loadport For Panel Level Packaging

Five-Year Review

| Designation | Standard Title | Action By | Assigned to |
|----------------|--|-------------|---------------------------|
| SEMI E166-0814 | Specification for 450 mm Cluster Module Interface: Mechanical Interface and Transport Standard | Summer 2019 | Global PIC Maintenance TF |

Staff Contact: Chie Yanagisawa, SEMI Japan (cyanagisawa@semi.org)

Attachment: 201903_JA-PIC_for-NA_v1.0_ACT

3.3 SEMI Staff Report

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

SEMI Global 2019 Calendar of Events

- SEMICON SEA (May 7-9, Kuala Lumpur, Malaysia)
- SEMICON West (July 9-11, San Francisco, California)
- SEMICON Europa (November 12-15; Munich, Germany)
- SEMICON Japan (December 11-13; Tokyo, Japan)



Upcoming North America Standards Meetings

- SEMICON West 2018 (July 8-11, 2019, San Francisco, California)
- NA Standards Fall 2019 Meetings (November 4-7, 2019, SEMI HQ in Milpitas, California)
- NA Standards Spring 2020 Meetings (March 30-April 2, 2020, SEMI HQ in Milpitas, California)

Letter Ballot Critical Dates for 2019

- Cycle 3-2019: ballot submission due: Mar 12/Voting Period: Mar 26 – Apr 25
- Cycle 4-2019: ballot submission due: Apr 16/Voting Period: Apr 20-May 30
- Cycle 5-2019: ballot submission due: May 10/Voting Period: May 24-Jun 24
- Cycle 6-2019: ballot submission due: Jul 19/Voting Period: Jul 31-Aug 30
- Cycle 7-2019: ballot submission due: Aug 22/Voting Period: Sept 4-Oct 4
- Cycle 8-2019: ballot submission due: Oct 11/Voting Period: Oct 25 – Nov 25
- Cycle 9-2019: ballot submission due: Nov 14/Voting Period: Nov 26 – Dec 26

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> |
|---------------|------------|----------------|-------------------|------------------|
| November 2018 | 1 | 0 | 2 | 0 |
| December 2018 | 0 | 7 | 6 | 0 |
| January 2019 | 2 | 0 | 0 | 0 |
| February 2019 | 1 | 3 | 4 | 0 |

Total in portfolio – 1,000 (includes 268 Inactive Standards)

New Standards

| <i>Cycle</i> | <i>Designation</i> | <i>Title</i> | <i>Committee</i> | <i>Region</i> |
|---------------|--------------------|---|------------------|---------------|
| November 2018 | SEMI C97 | Specification for Determination of Particle Levels of Gases Delivered as Pipeline Gas or by Pressurized Gas Cylinder | Gases | NA |
| January 2019 | SEMI M88 | Practice for Sample Preparation Methods for Measuring Minority Carrier Diffusion Length in Silicon Wafers by Surface Photovoltage Methods | Silicon Wafer | JA |
| January 2019 | SEMI T23 | Specification for Single Device Traceability for the Supply Chain | Traceability | NA |
| February 2019 | SEMI PV89 | Test Method for Current-Voltage Measurement in Indoor Lighting for Dye-Sensitized Solar Cell and Organic Photovoltaic | Photovoltaic | TW |

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 | 12 |
| FPD – Substrate | 1 |
| Gases | 18 |
| Information & Control | 37 |
| Liquid Chemicals | 24 |
| MEMS | 3 |
| Metrics | 9 |
| Micropatterning | 29 |
| Photovoltaic | 1 |
| Physical Interfaces & Carriers | 19 |
| Silicon Wafer | 11 |
| Traceability | 8 |

connect@SEMI

- 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
 - Add member
 - Upload meeting minutes
 - Communicate TF members
 - Contact your staff if a TF Site is desired
- Details
 - www.semi.org/standards >> Committee Info >> Collaboration Community

New Forms, Regulations & Procedure Manual

- *Regulations* (Feb 28, 2019)
 - Latest version clarifies procedures applicable for Copyrighted Items and trademarks
- *Procedure Manual* (Feb 28, 2019)
- SNARF (Feb 2019)
- www.semi.org/standards
 - Bottom left, under **Resources**

Style Manual Update



- Style Manual Version 6 (March 25, 2019)
 - Additions and revisions to harmonize with updated *Regulations* and *Procedure Manual*
- Updates
 - Company or Organization Trademarks (Table 1, #1-24)
 - Active vs. Passive Voice (Table 4, #4-4)
 - Word Usage (Table 4, #4-5)
 - New Safety Guideline Conformance Notice (Table 8, #8-1)
- www.1semi.org/standards/standardspublications
 - Under Document Authoring Tools

Nonconforming Titles (See PM Appendix 4) {None}

Five-Year Review

| Designation | Standard Title | Action By | Assigned to |
|----------------|--|--|----------------|
| SEMI E166-0814 | Specification for 450 mm Cluster Module Interface: Mechanical Interface and Transport Standard | Summer/ Fall 2019 *Global PIC TF in Japan Chapter | SEMI E166-0814 |

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

Attachment: Staff Report April 2019_PIC

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 # 6311, New Standard: Specification for TEM Lamella Carrier Used in Electron Microscopy Workflows

- The committee found the negatives related and persuasive. The ballot failed and returned to the task force for re-work and re-ballot in the next cycle.

Motion: To find Negative 2, 3, 4 related and technically persuasive, fail the document and return to the TF for rework.

By / 2nd: Laurens Kwakman (Thermo Fisher Scientific) / Larry Hartsough (UA Associates)

Discussion: You have to specify dim and ID Mark? Response: You can choose.

Vote: 7-0 in favor. Motion passed.

Motion: To authorize Ballot 6311A for reballot in Cycle 5-2019.

By / 2nd: Laurens Kwakman (Thermo Fisher Scientific) / Larry Hartsough (UA Associates)

Discussion: None.

Vote: 7-0 in favor. Motion passed.

Attachment: [Ballot Results] Cycle 02-2019 PIC

5 Subcommittee and Task Force Reports

5.1 Panel Level Packaging Panel FOUP Task Force

Shoji Komatsu (Acteon NEXT Corp) reported for this Task Force. Of note:

TF Leader & Sub-team activity



- TF co-leader: John Rudolph (Intel), Shoji Komatsu (Acteon NEXT)
- FOUP Team
- Leader: Tsukasa Fukunaga (SEP)
 - Make a proposal for discussion based on SEMI E158.
- Loadport/EFEM Team
 - Leader: Kiyoshi Kanashiro (TDK)
 - Make a proposal for discussion based on SEMI E154.

Discussion/Voting

- Change the panel support area
 - Motion by Otagawa-san/Daihen: There is a concern about the vibration and droop of panels during robot handling, we propose that the panel support areas and the end effector exclusion is configured the different value depending on the panel sizes as shown in the attached figures.
 - Second by Shida-san/SEP
 - Discussions, Mark/Hirata: no oppose, concern about vibration and drooping may not so large.
- Separate the FOUP size
 - Motion by Shida-san/SEP, In order to minimize the FOUP storage volume in the factory without changing the load port interface, we propose a 140 mm reduction in the depth of the 500 size FOUP as shown in the attached figure.
 - Second by Tominaga-san/Muratec
 - Discussions; If this motion is pass, COG position also separate.
 - *Need the revise the SNARF
- OHT hand discussion *{See attachment for image}*

Attachment: Panel FOUP TF report_20190403

5.2 Electron Microscopy Workflow Task Force

Laurens Kwakman (Thermo Fisher Scientific) reported for the EM Workflow Task Force. Of note:

Electron Microscopy Workflow Taskforce: activity update

Since last PIC TC meeting in November 2018, the Taskforce members have met three times in telephone conferences:

- January 17 and February 14:
 - Update on status of new lamella carriers build to new standard
 - Feedback from stakeholders on new LC Standard Doc 6311
 - Next steps for upcoming Letter Ballot in cycle #2, 2019
 - Distribution of Roadmap proposal for phase 2 TF activities in 2019
 - March 28:
 - Update on status of tests of new lamella carriers build to new standard
 - New LCs available and testing has been started; results were shared
 - Doc 6311 Ballot results and responses
 - 4 negatives and 3 comments from Ballot reviewed and evaluated
- ➔ New Doc 6311 version uploaded to SEMI website for review: from V3.0 (Ballot version) to V3.4 (Proposed response to Ballot results)

New Learning {See attachment for image}

- Manufacturability of the half-moon LC according to new Standard is an issue due to the critical position of the circle fiducial.
- Proposed design changes to test:
 - Smaller fiducials (risk: readability of fiducials due to camera limitations)
 - Fiducials placed 150 um lower
- Letter Ballot outcome
- All negatives are relevant and as such “persuasive”, however do not relate to technical flaws in Doc 6311
- Several comments, but not all, are relevant.
- Some of the comments are “technically persuasive”, identifying technical flaws in Doc 6311
- Most relevant Negatives: re-define the specifications of how ID mark quality can be guaranteed
- Most relevant comments: Incorrect figure 3: not coherent with text and intended definition of inspection zones (→ “technical persuasive negative”)

F2F Meeting Activity update

Objective of the meeting:

- Review Ballot results and discuss the response to negatives and comments
- Discuss and approve the proposed, already prepared new Doc6311A version
- Define the TF recommendation to the TC how to address negatives and/or editorial comments.

Meeting outcome:

- All Ballot results as well as new TF member comments were discussed.
 - New comments: e.g. “edge exclusion zone” and “rectangular fiducial”
- All taskforce members present (in person and via remote log-in) agree that the latest version of Document 6311A includes all Ballot feedback and further TF member comments properly and approve all changes made in Document 6311A
- All taskforce members agree that given the required technical changes in Document 6311, a new Ballot cycle is to be proposed to the PIC Technical Committee.

Outline of Negatives are show in PPTX Slides 6-10 {See attachment for detail of negatives}

Summary

The TF asked the committee to find the negatives presented in Section 4 of these minutes related and technically persuasive. The ballot failed and returned to the task force for re-work and re-ballot in the next cycle.

Attachment: EM Taskforce progress update for PIC TC meeting April 3 2019

6 Old Business

No old business was presented.

7 New Business

No new business was presented

8 Next Meeting and Adjournment

The next meeting is scheduled for Wednesday, July 10th in conjunction with SEMICON West 2019 at the Moscone Center in San Francisco, California See <http://www.semi.org/standards-events> for the current list of events.



Tentative Schedule:

Tuesday, April 2

13:00-15:00 Electron Microscopy (EM) Workflow TF

15:00-17:00 Japan Panel Level Packaging Panel FOUP TF

Wednesday, April 3

9:30-10:00 Global PIC Maintenance TF

10:00-12:00 PIC (C)

Adjournment: 10:45.

Respectfully submitted by:

Laura Nguyen

Sr. Coordinator, International Standards

SEMI Global Headquarters

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Minutes tentatively approved by:

| | |
|-------------------------------------|-----------------|
| Matthew Fuller (Entegris), Co-chair | June 26, 2019 |
| Melvin Jung (Intel), Co-chair | <Date approved> |

Table 13 Index of Available Attachments^{#1}

| <i>Title</i> | <i>Title</i> |
|---|--|
| SEMI Standards Required Meetings Elements | [Ballot Results] Cycle 02-2019 PIC |
| [2018Fall] PIC NA Minutes FINAL | Panel FOUP TF report_20190403 |
| Staff Report April 2019_PIC | EM Taskforce progress update for PIC TC meeting April 3 2019 |
| 201903_JA-PIC_for-NA_v1.0_ACT | |

^{#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.