



Physical Interfaces & Carriers North America TC Chapter

Meeting Summary and Minutes

NA Standards Fall Meetings 2019
 Wednesday, November 6, 10:00 – 12:00 Pacific
 SEMI Global Headquarters, Milpitas, California/USA

TC Chapter Announcements

Next TC Chapter Meeting

NA Standards Spring Meetings 2020

Wednesday, April 1, 10:00 – 12:00 Pacific

SEMI Global Headquarters, Milpitas, California/USA

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	Shin-Etsu Polymer Co., Ltd.	Shida	Hiroyuki
Daifuku Co., Ltd.	Yamagata	Kenji	SINFONIA Technology America	Taniyama	Yasushi
Entegris	Fuller	Matthew	SINFONIA Technology America	Umezu	Kaname
Intel	Jung	Melvin	TDK	Kanashiro	Kiyoshi
Intel	Rudolph	John	Thermo Fisher Scientific	Kwakman	Laurens
JEOL Ltd.	Asayama	Kyoichiro	UA Associates	Hartsough	Larry
Miraial Co., Ltd.	Nagashima	Tsuyoshi			
<i>Self</i>	<i>Wagner</i>	<i>Peter</i>	SEMI	Nguyen	Laura

Table 2 Leadership Changes

<i>WG/TF/SC/TC Name</i>	<i>Previous Leader</i>	<i>New Leader</i>
Electron Microscopy Workflow TF	Troy Morrison (Thermo Fisher Scientific)	Laurens Kwakman (Thermo Fisher Scientific)

Table 3 Committee Structure Changes

None

Table 4 Ballot Results

None

#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

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

#	Type	SC/TF/WG	Details
6592	SNARF	Electron Microscopy Workflow TF	New Standard: Specification for Container for Transport and Storage of Transmission Electron Microscope (TEM) Lamella Carriers within Electron Microscopy Workflows

#1 SNARFs and TFOFs are available for review on the SEMI Web site at:

<http://downloads.semi.org/web/wstdsbal.nsf/TFOFSNARE>

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

Item #	Assigned to	Details
2019Nov#01	SEMI Staff	Japan PLP Panel FOUP TF Leader asks for potential LOI from IP owner .

Table 12 Previous Meeting Action Items

Item #	Assigned to	Details
2019July#01	Laura Nguyen	To clarify footnote in Style Manual with SEMI. Ongoing
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 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 Meeting 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: Kenji Yamagata (Daifuku) / Shoji Komatsu (Acteon NEXT)

Discussion: None.

Vote: 9-0 in favor. Motion passed.

Attachment: [2019West] PIC NA TC Chapter Meeting 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*

Kenji Yamagata (Daifuku Co., Ltd.) reported for the Physical Interfaces & Carriers Japan TC Chapter. Of note:

Meeting Information

- Last meeting
 - September 20 at the Japan Standards Fall 2019 Meetings; SEMI Japan office, Tokyo, Japan
- Next meeting
 - December 11 at the Japan Standards Winter 2019 Meetings in conjunction with SEMICON Japan 2019; Tokyo Big Sight, 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)

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

Ballot Results

- 6525, Reapproval of SEMI E166-0814: Specification for 450 mm Cluster Module Interface: Mechanical Interface and Transport Standard
 - Passed, as balloted.
- *6485: New Standard: Specification for Panel FOUF For Panel Level Packaging was submitted for Cycle 6. However, per Regulations 9.3.2, this letter ballot failed because it has not attained a 60% return rate until 3 business days before the date of the scheduled TC Chapter meeting.

Task Force Highlights

300mm Tape Frame PI&C Task Force

- Leaders: Hayato Iwamoto (Sony Semiconductor Solutions), Hisashi Gotoh (Sony Semiconductor Solutions), Naomune Taniguchi (Tokyo Seimitsu)
- Background of the TF formation



- Requirements on device quality are getting higher at the back-end process
- Back-end process also requires the mini-environment similar to the one used at front-end process to ensure the device quality
- Standardizing the carrier and its physical interface can utilize development and design effort as semiconductor industry
- Discussion
 - The task force is seeking more inputs from major companies across the supply chain to ensure the true needs of the industry are reflected in the Task Force's work. Standardizing key parameters for a FOUP and related physical interfaces could significantly reduce R&D costs, and your company's input would be greatly valued. Please join it! Panel Level Packaging (PLP) Panel FOUP Task Force
- SNARFs approved
 - 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
- Discussion
 - Pitch budget in a FOUP has been recently discussed

Panel Level Packaging (PLP) Panel FOUP Task Force

- Leaders: Shoji Komatsu (Acteon NEXT), John Rudolph (Intel)
- 6485: New Standard: Specification for Panel FOUP For Panel Level Packaging
 - Ballot submitted in Cycle 6 but the return rate has not reached to 60%, so it failed.
 - SNARF to be revised
 - Ballot submission in Cycle 1/2-2020 to be proposed at the next Japan TC Chapter meeting on December 11
- 6486: New Standard: Specification for Panel FOUP Loadport For Panel Level Packaging
 - SNARF to be revised
 - Ballot submission in Cycle 1/2-2020 to be proposed at the next Japan TC Chapter meeting on December 11

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

Attachment: 201910_JA-PIC_for-NA_v1.0

3.3 SEMI Staff Report

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

SEMI Global Calendar of Events

- SEMICON Europa (November 12-15; Munich, Germany)
- SEMICON Japan (December 11-13; Tokyo, Japan)
- SEMICON Korea (February 5-7; Seoul, Korea)

Upcoming North America Standards Meetings

- NA Standards Spring 2020 Meetings (March 30-April 2, SEMI HQ in Milpitas, California)
- SEMICON West 2020 Meetings (July 20-23, Moscone Center, San Francisco, California)



- NA Standards Fall 2020 Meetings (November 2-5, SEMI HQ in Milpitas, California)

Letter Ballot Critical Dates for 2019

- 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
- Cycle 1-2020: Ballot Submission Due: Jan 6/Voting Period: Jan 15 – Feb 14
- Cycle 2-2020: Ballot Submission Due: Jan 30/Voting Period: Feb 11 – Mar 12
- Cycle 3-2020: Ballot Submission Due: Mar 11/Voting Period: Mar 25 – Apr 24

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>
March 2019	2	3	0	0
April 2019	2	12	5	0
May 2019	1	1	1	0
June 2019	2	9	2	0

Total in portfolio – 1,010 (includes 269 Inactive Standards)

New Standards

<i>Cycle</i>	<i>Designation</i>	<i>Title</i>	<i>Committee</i>	<i>Region</i>
July 2019	SEMI S30	Safety Guideline for Use of Energetic Materials in Semiconductor R&D and Manufacturing Processes	EHS	NA
July 2019	SEMI 3D20	Specification for Panel Characteristics for Panel Level Packaging (PLP) Applications	3D-IC	NA
August 2019	SEMI A3	Specification for Printed Circuit Board Equipment Communication Interfaces (PCBECI)	Automation Technology	TW
August 2019	SEMI HB11	Specification for Sapphire Single Crystal Ingot Intended for Use for Manufacturing HB-LED Wafers	HB-LED	CH
September 2019	SEMI E177	Specification for Transmission Electron Microscope (TEM) Lamella Carriers Used in Electron Microscopy Workflow	PIC	NA
October 2019	SEMI 3D21	Guide for Describing Glass-Based Material for Use in 3DS-IC Process	3D-IC	NA
October 2019	SEMI PV91	Specification for Trichlorosilane Used in Polysilicon Production	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	24
MEMS	3
Metrics	9
Micropatterning	30
Photovoltaic	1
Physical Interfaces & Carriers	19
Silicon Wafer	11
Traceability	8

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

Regulations & Procedure Manual

- *Regulations* (Feb 28, 2019)
 - Latest version clarifies procedures applicable for Copyrighted Items and trademarks
- *Procedure Manual* (Feb 28, 2019)
- 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)

Nonconforming Titles (See PM Appendix 4) {None}

Five-Year Review

- SEMI E83-0515, Specification for PGV Mechanical Docking Flange
- SEMI E92-0302E (Reapproved 0615), Specification for 300 mm Light Weight and Compact Box Opener/Loader to Tool-Interoperability Standard (Bolts/Light)
- SEMI E22-1015, Specification for Cluster Tool Module Interface: Transport Module End Effector Exclusion Volume
- SEMI E21-1015, Specification for Cluster Tool Module Interface: Mechanical Interface and Wafer Transport

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

Attachment: Staff Report November 2019_PIC

4 Ballot Review

None

5 Subcommittee and Task Force Reports

5.1 Panel Level Packaging Panel FOUP Task Force

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

Document Development Status

- FOUP
 - SNARF: TF members review: Nov 5
 - PIC Two-Week SNARF TC Member Review: Nov 26
 - Approval the SNARFs by JA PIC: Dec 11
 - Approval the submission of all FOUP Ballots by JA PIC: Dec 11
- Intellectual Property Consideration
 - Two IPs may be potential materials. The TF leader asks the SEMI staff for the LOI from the IP owner.
- Loadport
 - LP/EFEM Ballot 6486 is currently under development.
 - Also, There is a possibility of changing to the standard using subordinate.
 - The ballot time is expected to be slightly delayed.

Action Item: 2019Nov#1, SEMI Staff to check LOI from IP owner.

Attachment: Panel FOUP TF report_20191106

5.2 Electron Microscopy Workflow Task Force

Laurens Kwakman (Thermo Fisher Scientific) reported for this Task Force. Of note:

Taskforce activity update

Since last PIC TC meeting in July 2019, the Taskforce members have met two times in telephone conferences:

August 8

- Update on status of development and testing of new lamella carriers
 - Set of new LCs were dispatched to Thermofisher USA, Intel and Japan TF for further evaluations
- Next phase activities were discussed and agreed upon by all TF members
 - Focus on new LCC Standard, no other Standards activities were proposed
- It was agreed to prepare a SNARF and to discuss the SNARF content in the next TF meeting

September 19:

- SNARF reviewed and approved by taskforce
 - Team agreed to cancel Oct meeting and submit SNARF to PIC TC
- Japan Liaison team presented Summary of LC test results
 - Silicon or carbon covered ID marks result in grade D,F.
 - New HM LC works well with Hitachi FIB/SEM thanks to the 82.5 degree b angle

Face to face Taskforce meeting, November 5, 2019:

- Update on SNARF status
- Information about intended Taskforce leadership transfer from Troy to Loek

- Peter Wagner presented the editorial changes that are proposed to the SEMI E177-0919 document and the TF approved this change request- a motion to accept these changes will be made in the PIC TC meeting (November 6, 2019)
- The Japanese TF liaison team presented latest results on new LC tests:
 - LC dimensions were checked using image coordinates transforms and were found all to be within the specified tolerances
 - The initially poor ID marks on Silicon HM-LCs and Carbon coated 3mm LCs could be improved considerably by adapting the ID mark processes: smaller dots for Silicon and very shallow dots for Carbon coated LCs yield ID marks with Grade A quality:
 - Also Thermofisher presented some latest test results on the new LCs
 - Manufacturer quality of the LCs and Carbon foils is good (TEM)
 - Chiral central fiducial on 3mm LC is good for TEM automation, chiral central fiducial is missing on HM LCs (may require a technical update of E177-0919)
 - Most foil damage and particles seen on LCs are believed to originate from poor handling and shipping and from the laser ID marking process
 - Phase 2 activities were kicked-off by two presentations from grid suppliers Tedpella and Protochips on current practices with LC shipping boxes
 - The Japanese TF liaison team presented ideas for LCC formfactors, e.g. rotating disk or linear trays
 - Thermofisher showed videos illustrating the feasibility of vacuum based LC pick & place as well as of vision based navigation with a first prototype LCC
 - The TF meeting was concluded with a Thermofisher prepared list of relevant LCC specifications, assumptions and options. All TF members were invited to review this list and to provide feedback and new inputs in upcoming TF meetings.

Editorial Change request for SEMI E177-0919 Standards document

- During proof reading of the SEMI E177-0919 Lamella Carrier Standards document some inconsistencies were detected in the document text, mainly related to numbering and cross-referencing between text and tables
- The proposed editorial changes to correct these inconsistencies have been discussed with the Taskforce members present (in person or via remote login) during the Taskforce meeting of November 5, 2019.
- None of the Taskforce members disagreed with these editorial changes and it was agreed to present this editorial change request to the PIC TC during its meeting of November 6, 2019
- The proposed changes are presented here after.
 - *See attachment for changes.*
 - Motions are recorded below:

Motion: Motion to approve the proposed editorial changes as shown to the TC Chapter in the excel document for SEMI E177.

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

Discussion: None.

Vote: 9-0 in favor. Motion passed.

Motion: This is not a Safety Document, when all safety-related information is removed, the Document is still technically sound and complete. (*Regulations* ¶ 8.7.1)

By / 2nd: Laurens Kwakman (Thermo Fisher) / Kenji Yamagata (Daifuku)

Discussion: None.

Vote: 10-0 in favor. Motion passed.



IP Check

The TC Chapter meeting chair asked those participating, if they were aware of any patented technology that might be relevant (see Regulations ¶ 16.3.1.1) to the Standard or Safety Guideline; or, any copyrighted items or trademarks that are used/reproduced (see Regulations ¶ 16.4.1.2) in the Standard or Safety Guideline. (Also see, Regulations § 8.8)

- The question is NOT answered in affirmative.

Motion: Document passes TC Chapter review with editorial changes to SEMI E177 as shown and will be forwarded to the ISC A&R SC for procedural review.

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

Discussion: None.

Vote: 9-0 in favor. Motion passed.

Task Force leadership change request

Due to other responsibilities of Troy Morrison within Thermo Fisher, it is proposed to transfer the Taskforce Leadership to Laurens Kwakman, a motion for this Taskforce leadership change will be made in the PIC TC meeting of November 6, 2019

Motion: Motion to appoint Laurens Kwakman as the new EM Workflow Task Force leader.

By / 2nd: Larry Hartsough (UA Associates) / Kenji Yamagata (Daifuku)

Discussion: None.

Vote: 8-0 in favor. Motion passed.

New SNARF Approval “Specification for a Container for Lamella Carriers used in Electron Microscopy Workflows”

- The SNARF has been submitted for a PIC TC review cycle from 9 to 22 October 2019:
 - The SNARF passed the two weeks with no comments
 - The SNARF approval will be discussed in the PIC TC meeting of November 6, 2019
- The current SNARF has to be updated with one administrative change, related to previous motion above:
 - Update the Task leader information from Troy Morrison to Laurens Kwakman

Motion: Motion to approve SNARF as updated in the TC Chapter Fall meetings 2019.

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

Discussion: None.

Vote: 9-0 in favor. Motion passed.

Attachment: SEMI TF meeting 5 November2019_PICupdate V2_atm

Attachment: Proposed editorial changes to E177_atm.xlsx

Attachment: SNARF LCContainer_v5_atm

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, April 1, in conjunction with the NA Standards Spring 2020 Meetings at SEMI Headquarters in Milpitas, California. See <http://www.semi.org/standards-events> for the current list of events.

Tentative Schedule:

Tuesday, March 31

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

15:00-17:00 Japan PLP Panel FOUP TF

Wednesday, April 1

09:30–10:00 Global PIC Maintenance TF

10:00-12:00 PIC (C)

Adjournment: 11.58.

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	<Date approved>
Melvin Jung (Intel), Co-chair	<Date approved>

Minutes approved by: PIC NA OVTCCM on February 8, 2021

Table 13 Index of Available Attachments^{#1}

<i>Title</i>	<i>Title</i>
SEMI Standards Required Meeting Elements	Panel FOUP TF report_20191106
[2019West] PIC NA TC Chapter Meeting Minutes FINAL	SEMI TF meeting 5 November2019_PICupdate V2_atm
201910_JA-PIC_for-NA_v1.0	Proposed editorial changes to E177_atm.xlsx
Staff Report November 2019_PIC	SNARF LCCContainer_v5_atm

^{#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.