



Physical Interfaces & Carriers North America TC Chapter

Meeting Summary and Minutes

SEMICON West 2018 Standards Meetings

Wednesday, July 11, 10:00 – 12:00 Noon

Marriott Marquis Hotel, San Francisco, California

TC Chapter Announcements

Next TC Chapter Meeting

NA Standards Fall 2018 Meetings

Wednesday, November 7, 10:00 – 12:00 Noon

SEMI Headquarters, Milpitas, 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	Murata Machinery, Ltd.	Tominaga	Tadamasa
Daifuku Co, Ltd	Yamagata	Kenji	Self	Wagner	Peter
Daihen	Sado	Daisuke	Shin-Etsu Polymer Co., Ltd.	Shida	Haruo
Entegris	Fuller	Matthew	SUMCO Corporation	Nakai	Tetsuya
Hitachi High-Technologies Corp.	Ikota	Masami	Thermo Fisher Scientific	Morrison	Troy
TDK Corporation	Kanashiro	Kiyoshi	Thermo Fisher Scientific	Kwakman	Laurens
Intel	Jung	Melvin			
Intel	Komorowski	Jason			
Intel	Quinn	Thomas	SEMI	Nguyen	Laura
Middlesex	Pyke	Adrian	SEMI Japan	Yanagisawa	Chie

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

None

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

<i>Item #</i>	<i>Assigned to</i>	<i>Details</i>

Table 12 Previous Meeting Action Items

<i>Item #</i>	<i>Assigned to</i>	<i>Details</i>
2017April#04	Laura Nguyen	To identify which documents under the global task force belong to which committees. Ongoing.
2018April#01	Larry Hartsough	Prepare SNARFs for Fall Meetings. Komatsu-san created SNARFs. Completed.

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: Kenji Yamagata (Daifuku) / Thomas Quinn (Intel)

Discussion: None.

Vote: 10-0 in favor. Motion passed.

Attachment: [2018Spring] PIC NA Minutes FINAL

3 Liaison Reports

3.1 Physical Interfaces & Carriers Japan TC Chapter

Kenji Yamagata (Daifuku) reported for the Japan TC Chapter. Of note:

Meeting Information

- Last meeting
 - Thursday, April 26, 2018 at Japan Spring 2018 Meetings; SEMI Japan Office, Tokyo
- Next meeting
 - Friday, July 20, 2018 at Japan Summer 2018 Meetings; SEMI Japan Office, Tokyo

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 Task Force
 - Newly formed

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

Task Force Highlights

Japan Electron Microscopy Workflow Liaison Task Force

- Leadership: Kyoichiro Asayama / JEOL, Tsuyoshi Onishi / Hitachi High-Technologies
- Consideration about automation of TEM {See attachment for embedded file}
 - TF had discussions with Material Handling Makers and the participants found End User's guidance is crucial for developing useful Standards.
 - The two items (throughput and distance) are shown at Teleconference on May 10 among the items of the condition shown by ESG-J AMHS SG at Teleconference on March 22. So, the TF shows the rest of the items at Teleconference on June 15 as attached.
- Showing the idea for TF's globalization
 - There are several material handling makers in Japan and that may help proceeding the activities for automation
 - If it becomes a global TF, several topics could be handled in multiple local TFs respectively in parallel, so the Standardization for TEM could go faster.

Fan-Out Panel Level Packaging (FO-PLP) Panel FOUP Task Force

- Leader: Shoji Komatsu / Acteon NEXT
- TFOF was approved at the PI&C Japan TC Chapter meeting on April 26.
 1. Charter:
 - a. This TF will focus on the development on Panel FOUP and related physical interface standards for FO-PLP utilizing existing SEMI 450mm standards.
 - b. The target panel size is assumed as follows; Width 500~650mm x Depth 500~650mm
 2. Scope:
 - a. Develop the requirements for: Panel FOUP and Equipment to Panel FOUP interfaces



- b. TF meetings were held on May 17 and June 19
- c. Timeline
 - Approval of ballot submission at SEMICON Japan 2018
 - Ballot review at Japan Spring Meetings 2019

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: 20180627_JA-PIC_for-SW_v1.0

3.2 SEMI Staff Report

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

SEMI Global 2018 Calendar of Events

- SEMICON West (July 10-12; San Francisco, California)
- SEMICON Taiwan (September 5-7; Taipei, Taiwan)
- SEMICON Europa (November 13-16; Munich, Germany)
- SEMICON Japan (December 12-14; Tokyo, Japan)

Upcoming North America Standards Meetings

- NA Standards Fall 2018 Meetings (November 5-8, 2018, SEMI HQ in Milpitas, California)
- NA Standards Spring 2019 Meetings (April 1-4, 2019, SEMI HQ in Milpitas, California)
- SEMICON West 2019 (July 8-11, 2019, San Francisco, California)

Letter Ballot Critical Dates for 2018

- Cycle 6-2018: ballot submission due: July 20/Voting Period: August 1 – August 31
- Cycle 7-2018: ballot submission due: August 22/Voting Period: September 5 – October 5
- Cycle 8-2018: ballot submission due: October 12/Voting Period: October 26 – November 26
- Cycle 9-2018: ballot submission due: November 14/Voting Period: November 28 – December 28

Critical Dates: <http://www.semi.org/en/Standards/Ballots>

Standards Publications Report

Cycle	New	Revised	Reapproved	Withdrawn
April 2018	0	9	2	0
May 2018	0	3	5	0
June 2018	2	14	11	0

Total in portfolio – 987 (includes 236 Inactive Standards) *{See attachment for details}*



New Standards

<i>Cycle</i>	<i>Designation</i>	<i>Title</i>	<i>Committee</i>	<i>Region</i>
June 2018	SEMI C96	Test Method for Determining Density of Chemical Mechanical Polish (CMP) Slurries	Liquid Chemicals	NA
June 2018	SEMI D77	Test Method for Measurements of Dimension of Films for FPD – Contour Matching Method	Flat Panel Display	JA

New Forms, Regulations & Procedure Manual

- New version of Regulations (June 8, 2018)
- New version of Procedure Manual (June 8, 2018)
- New TFOF & SNARF forms
- New Ballot Review Templates
- www.semi.org/standards
 - Bottom left, under **Resources**

Regulations & Procedure Manual Changes

- Improvements on Rules for Handling of Patented Technology (Regulations § § 16.1-16.3)
 - Patented Technology that might be material to the Standard is disclosed at the end stage of document development
 - Disclosed after the ballot is issued
 - Assessment for potential materiality and technical justifiability for inclusion shall be postponed to the next scheduled meeting.
- A TF sometimes decides to use patented technology after it has started the document development project.
 - To require subsequent update of SNARF regarding use of Patented Technology and subsequent LOI process to ensure that TC Chapter agrees to the course of action recommended by the TF.
- Improvements on Rules for Handling of Copyright and Trademark (*Regulations* § 16.4)
 - Improvement on handling copyright process
 - New process for handling trademarks
- Additional Official Virtual TC Chapter Meeting Related Rules (*Regulations* ¶¶ 7.4.2 and § 9.5)
 - Loss of necessary infrastructure at the meeting location described in the Background Statement of the Letter Ballot
 - The necessary infrastructure (e.g., electrical power, internet connection, required software applications)
 - Procedure for Transition of Virtual Meeting (PM 4.3.6)
 - GTC Decision for Whether or Not to Adopt the Official Virtual TC Chapter Meeting
- Clarification on the Use of Editorial Changes a Standard or Safety Guideline (Regs § 8.9.5)
 - Two types, made independently from a Letter Ballot.
 - Both requires TC approval and subsequent A&R approval.
 - Type 1:
 - minor changes (i.e., corrections of obvious misspelling, formatting changes to comply with the Style Manual; corrections of capitalization, the use of italics, incorrect spacing);



- Type 2:
 - those that introduce no change in technical content (e.g., changes to nontechnical information; insubstantial changes to existing Supplementary Materials; changes that reduce ambiguity; changes to eliminate an obvious technical content inconsistency; or adding/deleting/changing Notes or footnotes).
- Clarification on SNARF Revision vs. New SNARF (PM 2.2.6)
 - The SNARF should be revised if the Draft Document deviates technically from the scope described in the SNARF or changes in the 'Intellectual Property Considerations' section
 - New SNARF is required
 - expected result of activity changes from Line Item revision(s) to a major revision, or
 - scope change beyond modification of existing scope items (i.e., deleting existing or adding new scope items),
 - change of ballot type (e.g., reapproval to revision or vice versa), or
 - introduction of new Line Item(s)

Nonconforming Titles (See PM Appendix 4)

- SEMI E152-0214, Mechanical Specification of EUV Pod for 150 mm EUVL Reticles
- SEMI E154-0814, Mechanical Interface Specification for 450 mm Load Port
 - Originated in NA
 - Last reviewed in Japan
- SEMI E158-0314, Mechanical Specification for Fab Wafer Carrier Used to Transport and Store 450 mm Wafers (450 FOUP) and Kinematic Coupling
- SEMI E159-0314, Mechanical Specification for Multi Application Carrier (MAC) Used to Transport and Ship 450 mm Wafers

Five-Year Review

- SEMI E152-0214, Mechanical Specification of EUV Pod for 150 mm EUVL Reticles
- SEMI E158-0314, Mechanical Specification for Fab Wafer Carrier Used to Transport and Store 450 mm Wafers (450 FOUP) and Kinematic Coupling
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SNARF 3 Year Status, TC Chapter may grant a one-year extension {None}

Attachment: [2018West] Staff Report 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.

None.

5 Subcommittee and Task Force Reports

5.1 Electron Microscopy (EM) Workflow Task Force

Troy Morrison (Thermo Fisher Scientific) reported for this Task Force. Of note:

- Reviewed 1st draft standard document (as distributed 2 July)
 - *{See attachment for images}*
- Stakeholder Request for Information *{See attachment for images}*
 - Warp: Why 100um?
 - See existing Semi terminology
 - Lamella Carrier Thickness: need a spec or leave open?
 - Half moon dimension: why 72 degrees?
 - Pins: What is max #?
 - Fiducial marker: why circle and triangle? What is optimal shape?
 - Can ID mark be in same location for both lamella carrier types?
 - Barcode marking: feasibility study
 - Data Matrix: ISO / IEC 16022
 - End effector feasibility study
- Next Steps
 - Open call to task force for feedback
 - End users: Will this work with your lab workflow, logistics?
 - Gridmakers: Feedback on mfg feasibility
 - Equipment makers: Will the specification enable automation?
 - Next meeting: August 16th, 7am PDT
 - Draft specification document will be updated and distributed by Aug 9th.
 - Creation of separate FAQ document to explain the rationale behind document
 - Next meeting will focus on answers to stakeholder questions from 10 July mtg
 - Task force will continue monthly revisions until ready for ballot.

Task Force leader contact: Troy Morrison, troy.morrison@thermofisher.com

Attachment: 10July_EMWorkflowTaskforcerMtgMinutes

ESG-J AMHS Sub-Group

Comments from ESG-J AMHS-SG

- End Effector for Lamella carrier handling (from AMHS maker)

Considering the handling tools for small work such as die bonder often adsorbs the work at its center, marathon test(s) would be required to see if it is practical to restricting the handling zone (the area that can be gripped/ adsorbed) to the outer circumference of small work.

- Half Moon Lamella Carrier (from EM maker)

To avoid the interference with the deposit nozzle and the sampling probe, and to have larger active area, Rim open sector angle (β) should be wider as much as possible.



- Fiducial Mark specification (from EQ maker)

Feasibility study whether the shape of Fiducial Mark and accuracy of marking such as the position and angle are acceptable for expected reading error, is required.

- ID mark location (from AMHS maker)

The ID mark location should be same in relation to fiducial marks between the full moon Lamella Carrier and half moon Lamella Carrier.

- No definition for Data Matrix Code (from Sensor maker)

In order to realize stable operation, it should describe that it is a Data Matrix defined in "ISO / IEC 16022".

- No definition for maximum/minimum Symbol Size (from Sensor maker)

Marking position and Dot size are defined, however, it is not enough. Layout zone of 2D code, Symbol size (maximum and minimum of number of dot x dot), Quiet zone (peripheral area of 2D code), Data length should be defined.

- No code quality verification (from Sensor maker)

To guarantee that IDs can be read, print quality should be defined. ISO / IEC 29158 should be quoted. In order to quote it, discussion is needed such as the material and color of the lamella carrier, the color when laser engraved, etc.

- ID specialist (from Sensor maker)

The definition of MARKING needs to use the ISO / IEC related to the 2D CODE described above and to fill in the necessary items to satisfy the operation of this application this time. In order to define them correctly, ID related specialists should join to this TF.

{Please see attachment for details.}

Attachment: 20180710_ESG-J AMHS_SG Consideration about the draft of lamella carriers_R 0.3

Other Discussion – International Global Task Forces

- PIC Japan to share proposal for globalization to PIC NA for the NA Electron Microscopy Workflow TF

5.2 Global PIC Maintenance Task Force

Matt Fuller (Entegris) reported for this Task Force. Of note:

- Reviewed Standards coming up for Five-year review.
- Japan PIC will issue SNARFs for Line Item Ballot for SEMI E152, E154, E158, and SEMI E159 (see slide 19 for details) at their summer meetings.

5.3 International Reticle SMIF Pod and Load Port Interoperability Task Force

Committee Structure Changes from Spring 2017 Meetings

- Disbandment of global TF endorsed by NA TC Chapter. Additional endorsement from EU still required.

6 Old Business

6.1 Previous Action Items

Previous action items are noted in Table 12 in 'red' and for recent updates in 'blue'. There is no further old business.

7 New Business

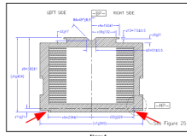
7.1 E158 Conveyor Runner Revision, PIC-NA, 20180711

Middlesex General Industries, Inc. presented a proposal to revise SEMI E158.

The presentation as followed:

E158 - Conveyor Runner Revision

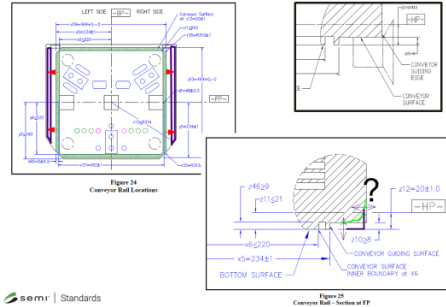
- Large mass of 450mm -> Current runners inadequate.
 - Safety concern containing FOUP at high speed.
 - 8mm guidance surface too small



- Increase guidance surface height.
- Move runners more outboard.
- Contain FOUP with conveyor frame for safety.

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One possible solution



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E158 - Conveyor Runner Revision

- SNARF and TFOF
 - Explore possible technical solutions/locations
 - Minimal impact to all stake holders
- Now is the time before widespread 450mm adoption...

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Of note:

- The TC Chapter has agreed to not work on 450 mm Standards until there is an industry push.
- The TC Chapter will table this proposal for a later time.

8 Next Meeting and Adjournment

The next meeting is scheduled for Wednesday, November 7, 2018 at the NA Standards Fall 2018 Meetings located at SEMI Headquarters in Milpitas, California. See <http://www.semi.org/standards-events> for the current list of events.

Tentative Schedule:

Tuesday, November 6

15:00-17:00 Electron Microscopy (EM) Workflow TF

Wednesday, November 7

09:00-10:00 Global PIC Maintenance TF

10:00-12:00 PIC (C)

Adjournment: 11:29.



Respectfully submitted by:

Laura Nguyen

Coordinator, International Standards

SEMI Headquarters

Phone: 1.408.943.7019

Email: lnguyen@semi.org

Minutes tentatively approved by:

Matthew Fuller (Entegris), Co-chair	August 1, 2018
Melvin Jung (Intel), Co-chair	<Date approved>

Table 13 Index of Available Attachments^{#1}

<i>Title</i>	<i>Title</i>
SEMI Standards Required Meeting Elements	10July_EMWorkflowTaskforcerMtgMinutes
[2018Spring] PIC Minutes FINAL	20180710_ESG-J AMHS_SG Consideration about the draft of lamella carriers_R 0.3
20180627_JA-PIC_for-SW_v1.0	E158 Conveyor Runner Revision, PIC-NA, 20180711
[2018West] Staff Report PIC	

#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.