# Physical Interfaces & Carriers North America TC Chapter

# Meeting Summary and Minutes

NA Standards Fall Meetings 2023

Wednesday, November 8, 2023, 10:00 – 12:00 Noon Pacific

SEMI Global Headquarters, Milpitas, California, and via Official Virtual TC Chapter Meeting (OVTCCM)

## TC Chapter Announcements

*Next TC Chapter Meeting*

NA Standards Spring Meetings 2024

Wednesday, March 27, 10:00 – 12:00 Noon 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

| *Company* | *Last* | *First* | *Company* | *Last* | *First* |
|---|---|---|---|---|---|
| *Brooks Automation* | *Babbs* | *Daniel* | JEOL Ltd. | Asayama | Kyoichiro |
| *Entegris* | *Fuller* | *Matthew* | *Lam Research* | *Wong* | *Scott* |
| Hitachi-High Tech | Onishi | Tsuyoshi | *LK Semiconductor Consulting Services* | *Kwakman* | *Laurens* |
| *Infineon* | *Hollerith* | *Christian* | Tokyo Electron Limited | Mashiro | Supika |
| *Intel* | *Jung* | *Melvin* | *UA Associates* | *Hartsough* | *Larry* |
| *Intel* | *Radloff* | *Stefan* | SEMI | Nguyen | Laura |

### Table 2 Leadership Changes

| *WG/TF/SC/TC Name* | *Previous Leader* | *New Leader* |
|---|---|---|
| Integrated Workflows in Failure Analysis Task Force ***[New]*** | - | Thomas Schweinböck (Infineon)<br>Christian Hollerith (Infineon)<br>Florian Felux (Infineon)<br>Gabriel Reichl (Zeiss) |

### Table 3 TC Chapter Structure Changes

| *Previous WG/TF/SC Name* | *New WG/TF/SC Name or Status Change* |
|---|---|
| None | Integrated Workflows in Failure Analysis Task Force ***[New]*** |

### 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) and TFOF(s) approved by the Originating TC Chapter.

| *#* | *Type*[#1] | *SC/TF/WG* | *Details* |
|---|---|---|---|
| – | TFOF | Integrated Workflows in Failure Analysis TF | Integrated Workflows in Failure Analysis Task Force ***[New]*** |
| 7194 | SNARF | Film Frame FOUP TF | New Standard: Specification for 300 mm Film Frame FOUP Load Port |
| 7195 | SNARF | SEMI E72 Revision TF | Revision to SEMI E72-1016, Specification and Guide for Equipment Footprint, Height, and Weight |

#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

Listing of documents authorized by the Originating TC Chapter for Letter Ballot.

| *#* | *When* | *TF* | *Details* |
|---|---|---|---|
| 7195 | Cycle 1 or 2, 2024 | SEMI E72 Revision TF | Revision to SEMI E72-1016, Specification and Guide for Equipment Footprint, Height, and Weight |

### Table 8 SNARF(s) Granted a One-Year Extension

None

### Table 9 SNARF(s) Abolished

| *#* | *TF* | *Title* |
|---|---|---|
| 6919 | SEMI E72 Revision TF | Revision to SEMI E72-1016, Specification and Guide for Equipment Footprint, Height, and Weight |

### Table 10 Standard(s) to receive Inactive Status

None

### Table 11 New Action Items

| *Item #* | *Assigned to* | *Details* |
|---|---|---|
| 2023Nov#01 | Laura Nguyen | Laura to connect Loek with Christian to revise SNARF. Ongoing. |

### 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. Unsure how this should be done. |
| 2022Mar#01 | Larry Hartsough | Larry to check Five-Year docs for “must”, “shall”, and other PM related items. Ongoing. |
| 2022Mar#02 | Laura Nguyen | Laura to check internally to share top formatting examples to TF leaders. Ongoing. |
| 2022Mar#03 | Stefan Radloff | Prepare another SNARF for LoadPort, possibly by West. Ongoing. Completed. |
| 2022July#01 | Larry Hartsough | Provide tutorial for Inactive Standards. Ongoing. |

**Table 12 Previous Meeting Action Items**

| *Item #* | *Assigned to* | *Details* |
|---|---|---|
| 2022Nov#01 | Larry Hartsough | Put together a slide on how to add other things to consider in the future (such as, how to resolve different types of conflict; ex: SEMI E131 and E15.1 conflict) 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:** | By: Larry Hartsough / U.A. Associates<br>Second: Stefan Radloff / Intel |
| **Discussion:** | None. |
| **Vote:** | 8-0 in favor. Motion passed. |

**Attachment**: [2023West] PIC NA TC Chapter Meeting Minutes FINAL

## 3 Liaison Reports

### 3.1 *Physical Interfaces & Carriers Japan TC Chapter*

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

Meeting Information

- Last meeting
    - Thursday, July 21, 2023, OVTCCM / SEMI Japan Office (Hybrid)
- Next Meeting:
    - Thursday, December 14, 2023, in conjunction with SEMICON Japan 2022, Tokyo Big Sight, Tokyo, Japan + OVTCCM (Hybrid)

Leadership Changes: None

Organization Chart (*See attachment)*

Ballot Results: None

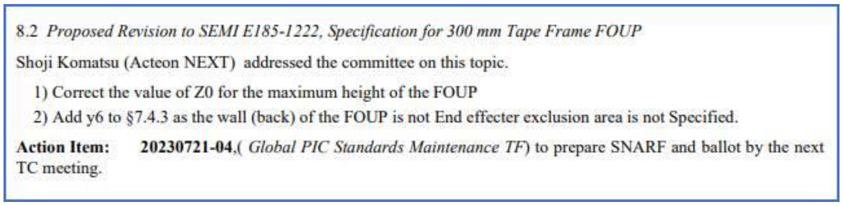
Authorized Ballots

| *#* | *When* | *TF* | *Details* |
|---|---|---|---|
| 7112 | Cycle 7 | Panel Level Packaging Panel FOUP | Line Item Revision to SEMI E181-0423 - SPECIFICATION FOR PANEL FOUP FOR PANEL LEVEL PACKAGING, SEMI E181.1-0423 - SPECIFICATION FOR PANEL FOUP FOR 510 mm – 515 mm PANEL SIZE and 12 SLOTS,<br>SEMI E181.2-0423 - SPECIFICATION FOR PANEL FOUP FOR 510 mm – 515 mm PANEL SIZE and 6 SLOTS,<br>SEMI E181.3-0423 - SPECIFICATION FOR PANEL FOUP FOR 600 mm – 600 mm PANEL SIZE and 12 SLOTS, and<br>SEMI E181.4-0423 - SPECIFICATION FOR PANEL FOUP FOR 600 mm – 600 mm PANEL SIZE and 6 SLOTS |

| *#* | *When* | *TF* | *Details* |
|---|---|---|---|
| 7113 | Cycle 7 | Panel Level Packaging Panel FOUP | Line Item Revision to SEMI E182-0621 - SPECIFICATION FOR PANEL FOUP LOADPORT FOR PANEL LEVEL PACKAGING |

Task Force Highlights

- Global PIC Maintenance TF
    - JA-TF will prepare SNARF and Ballot document of revision to SEMI E185 by the next TC chapter meeting



8.2 *Proposed Revision to SEMI E185-1222, Specification for 300 mm Tape Frame FOUP*

Shoji Komatsu (Acteon NEXT) addressed the committee on this topic.

1) Correct the value of Z0 for the maximum height of the FOUP
2) Add y6 to §7.4.3 as the wall (back) of the FOUP is not End effecter exclusion area is not Specified.

**Action Item:** **20230721-04**,( *Global PIC Standards Maintenance TF*) to prepare SNARF and ballot by the next TC meeting.

- Japan Electron Microscopy Workflow liaison TF

  Planning 2023 activities
    - Migrate from Doc. 6592 V.03 to a newer, more complete version (Q1-Q2, 2023)
        - Integrate specs for the listed additional LCC features in Doc 6592
        - Elaboration of specs in focus teams, review of specs with Taskforce
    - Review and approve new version, identify remaining updates (Q3, 2023)
        - Refine specifications
        - Create final draft for Ballot, review draft at Taskforce level
    - Issue first final version of Doc.6592 for a ballot cycle in Q4 (Q4, 2023)
        - In parallel: restart the activities for Doc 6832 (shipping container)
    - *Regular focus team meetings and (bi-) monthly Taskforce meetings to guarantee sufficient progress and adequate feedback from the entire value chain (customers, grid suppliers, …)*
- Panel Level Packaging(PLP) Panel FOUP TF
    - Two ballots are voting for extension in Cycle7, with the goal of ballot deliberation at SEMICON Japan in December.
    - Ballot doc.7112, E181 update : Panel FOUP
        - Add area for FOUP drop protection
        - FOUP internal clearance
        - Delete the number of slots information from Figure 24 *{see attachment}*
    - Ballot doc.7113, E182 update: Panel FOUP Loadport
        - Reduced Fork-Lift Exclusion Volume
        - Responding to A&R Rejected Application NotesE181 and E182 SNARF will be NA-PIC approved.

Five-Year Review: None

Staff Contact: Mami Nakajo (mnakajo@semi.org)

**Attachment:** JA_PIC_Liaison_20231018_R0_ACT

3.2 *SEMI Staff Report*

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

SEMI Global 2023 & 2024 Calendar of Events

- [2023] SEMICON Europa (Nov 15-17; Munich, Germany), SEMICON Japan (December 13-15; Tokyo)
- [2024] SEMICON Korea (Jan 31-Feb 2; Seoul, Korea), SEMICON China (Mar 20-22; Shanghai, China), SEMICON SEA (May 28-30; Kuala Lumpur, Malaysia), SEMCON West (July 9-11; San Francisco, CA)

Upcoming NA Meetings

- NA Standards Spring Meetings
  - March 25-28, 2024, at SEMI HQ, Milpitas, California/USA
- SEMICON West Standards Meetings
  - July 8-11, 2024, at Moscone Center, San Francisco, CA/USA

Critical Dates for SEMI Standards Ballots

- Cycle 8-2023: Ballot Submission Due: Oct 4/Voting Period: Oct 18 – Nov 17
- Cycle 9-2023: Ballot Submission Due: Nov 15/Voting Period: Nov 29 – Dec 29
- Cycle1-2024: Ballot Submission Due: Jan 3/Voting Period: Jan 17 – Feb 16
- Cycle 2-2024: Ballot Submission Due: Feb 1/Voting Period: Feb 14 – Mar 15
- Cycle 3-2024: Ballot Submission Due: Mar 6/Voting Period: Mar 20 – Apr 19
- Cycle 4-2024: Ballot Submission Due: Apr 24/Voting Period: May 8 – June 7
- Cycle 5-2024: Ballot Submission Due: May 7/Voting Period: May 21 – June 20

Standards Publications Report

| *Cycle* | *New* | *Revised* | *Reapproved* | *Withdrawn* |
|---|---|---|---|---|
| July 2023 | 0 | 5 | 1 | 0 |
| August 2023 | 3 | 8 | 8 | 0 |
| September 2023 | 3 | 14 | 11 | 0 |
| October 2023 | 0 | 5 | 25 | 0 |

Total in portfolio – 1,085 (includes 335 Inactive Standards)

New Standards

| *Cycle* | *Designation* | *Title* | *Committee* | *Region* |
|---|---|---|---|---|
| August 2023 | SEMI P49 (Preliminary) | Specification for Experimental Curvilinear Multigon Extension to SEMI P39 | Micropatterning | NA |
| August 2023 | SEMI PV101 | Guide for Scrap Judgement of Photovoltaic Modules in Building | Photovoltaic | CH |
| August 2023 | SEMI D84 | Test Method for Warm-Up Properties of Display Picture Quality | FPD – Metrology | JA |
| September 2023 | SEMI F121 | Guide for Evaluating Metrology for Particle Precursors in Ultrapure Water | Liquid Chemicals | NA |
| September 2023 | SEMI C105 | Guide for Trace Iron Analysis in High Purity 2-Propanol (IPA) | Process Chemicals | NA |
| September 2023 | SEMI M93 | Test Method for Quantifying Basal Plane Dislocation Density in 4H-SiC by X-Ray Diffraction Topography/Imaging | Compound Semiconductor Materials | EU |

EU Standards Meetings at SC Europa 2023 *{See attachment for schedule}*

New Online Ballot System *{See attachment for visuals}*

SVM – Addressing Critical Issues

- User Data Quality
    - Problem – User Data in SVM shows incorrect information
    - Cause – The SVM Login process has a separate User Database than the existing Online Ballot System and requires ongoing synchronization. Also affects https://connect.semi.org
    - Progress: Completed internal testing, Documentation and Training in development
- Open Community Preview of the New Online Ballot System during Cycle 9, 2023
    - Committee Members to become familiar with new interface and provide feedback
- Open New Online Ballot System for Live Ballot voting for Cycle 1, 2024

Five-Year Review: None

**Attachment:** Staff Report Nov 2023 v3_PIC

## 4 Ballot Review

| Listing of documents authorized by the Originating TC Chapter for Letter Ballot. |
|---|
| None |

## 5 Subcommittee and Task Force Reports

### 5.1 *Electron Microscopy Workflow Task Force*

Laurens Kwakman (LN Semiconductor Consulting ) reported for this Task Force. Of note *{See attachment for images}*:

Agenda

- Activity update since July 13, 2022, PIC meeting
- Outcome Focus Team Meetings
- Planning 2023-2024

Activity Update

- Since July 2023, the Taskforce has continued to advance the LCC specifications through focus team and taskforce meetings
    - Eight focus team meetings and three Taskforce meetings were organized in these last four months. Two version updates of Doc 6592 were done by Peter Wagner based on the outcome of these meetings.
    - The planning, however, has seen some slip due to significant time spent on lid sliding concepts compatible with plastic (injection molding) LCCs : the Draft LCC Standard for ballot in Q4 2023 will not be available until end Q1 2024…
- Progress made in July-October 2023
    - Specifications for LCC ID mark, LC array labels were finalized for Doc 6592 update
    - Specifications for LC pockets dimensions and formfactors were finalized for Doc 6592 update
    - It was decided that the LCC needs to be specified in detail for all parameters that influence the exchangeability between LCC lids and bases (separate parts): grooves, ridges and sliding mechanism dimensions all need to be specified…:

  - Different lid sliding designs were proposed, discussed and critical tolerances were identified & quantified… A design with feasible tolerances is available for metal LCCs but challenges with the tolerances for injection molding are to be addressed to arrive at a 'material indifferent' design
- Critical dimensions and associated tolerance have been reviewed; new design proposals are currently under review. *{See attachment for images}*
  - Critical tolerances are +/- 50 um…
  - Groove width needs to be 0.7 mm and Half-moon LC containment is not guaranteed for ridge distances > 1.5 mm…
- Update Doc 6592 *{See attachment for images}*
  - Critical and non-critical dimensions and tolerances have been identified for LCC base, but the groove dimensions and exact positions still need to be fixed!
- Planning 2023-2024 activities
- Aiming at a LCC Standards document ready for Ballot before end Q1 2024
- Migrate from Doc. 6592 V.03 to a newer, more complete version (Q1- Q3, 2023)
  - Integrate specs for the listed additional LCC features in Doc 6592
  - Elaboration of specs in focus teams, review of specs with Taskforce
- Review and approve new version(s), identify remaining updates (Q4, 2023 - Q1, 2024)
  - Decide if plastic LCCs are reasonable in view of non-compatible tolerances
  - Decide about two-phase approach: Standard aiming at metal LCC first, and work on another plastic LCC Standard that is functionally compatible later.
  - Refine specifications
  - Create final draft for Ballot, review draft at Taskforce level
- Issue first final version of Doc.6592 for a ballot cycle in Q4 (end Q1, 2024)
  - In parallel: restart the activities for Doc 6832 (shipping container)
- *Despite the bi-weekly, extended (1.5 hrs) focus team meetings, progress has been less as planned , primarily because the Taskforce wants to come-up with an LCC design that covers both metal and plastic versions…*

**Attachment:** SEMI EM TF -PIC Update 8 November 2023

5.2 *Film Frame FOUP Task Force (did not meet during this meeting set, will meet November 16, 2023)*

Stefan Radloff (Intel) reported for the FFF Task Force. Of note:

- TF have not met since SEMICON West
- Current Co-lead left the company
- TF has significant disagreement on the approach – making slow progress…
- Further offline discussions are conducted on ways to navigate the approach
- Goal: standardize similar carriers that are currently on the market
  - There may be multiple options in the standard
- Open: replacement of new TF leader to be nominated at the next meeting
- Motion to approve new SNARF for FFF
- Next TF meeting ~ next Thursday, Nov 16

On behalf of Stefan Radloff (Intel):

| | |
|---|---|
| **Motion:** | Approve the SNARF for:<br>New Standard: Specification for 300 mm Film Frame FOUP Load Port |
| **By / 2nd:** | By: Stefan Radloff / Intel<br>Second: laurens kwakman / LK Semiconductors Consulting Services |
| **Discussion:** | None |
| **Vote:** | 8-0 in favor. Motion passed. |

**Attachment:** SNARF_FFF LP (New)

5.3 *SEMI E72 Revision Task Force*

Supika Mashiro (TEL) reported for this Task Force. Of note:

Agenda

- TF roster and meeting attendance
- Activities from SEMICON WEST and today
- Request to NA Chapter of PIC GTC

Activities from SEMICON WEST and today

- Since the TF once decided to send the Standard as is for Reapproval, it would make sense to issue a Revision Ballot with minimum changes that address only the Negatives that would not affect the equipment-dimensions related requirements, so that we can measure if there is tangible needs for substantially changing E72 or not.

9/25 TF

- Motion to abolish current SNARF (Doc.#6919) in favor of balloting a document to revise E72 to address Negatives in a nature of editorial correction or demanding compliance to current rules (Regs/PM/SM).
    - Unanimously approved
- Motion to prepare a SNARF and a draft in line of above and try a revision ballot to solicit technical inputs, if any, or to confirm that the industry is content with the specification (equipment footprint, height, and weight) for 300mm production equipment in general as defined in E72-1016.
    - Unanimously approved

July to Today

- Disposition of each negative/comment received on the Reapproval ballot (Doc.#6834) has been discussed and reflected to the CoC Table.

TF request to the TC Chapter

- New SNARF for E72 Revision was agreed with editorial improvements.
- Two weeks TC Member Review received one comment (from Gavin Rider/Microtome)
    - My only comment would be that it would have been helpful to describe what the technically persuasive negative had been that prevented the reapproval of the original standard. Since the standard was written to advise designers of new equipment for the 300mm era, its primary purpose is long since past in my view, so work to adjust it now seems like bureaucratic effort just for the sake of it.
    - No action on the comment is deemed necessary by the TF as new design/development of 300mm production equipment continues, new Fab constructions as well.
- TF agreed to cancel SNARF #6919
    - To be proposed at TC Chapter meeting on 11/8 and approval of new SNARF is to be requested.
- New SNARF for E72 Revision
    - Motion to approve new SNARF #XXXX for revision of E72

- Request for new Letter Ballot submission approval
    - Motion to approve submission of Letter Ballot for voting.

On behalf of Supika Mashiro (TEL):

| | |
|---|---|
| **Motion:** | Approve the SNARF for:<br>Revision to SEMI E72-1016, SPECIFICATION AND GUIDE FOR EQUIPMENT FOOTPRINT, HEIGHT, AND WEIGHT |
| **By / 2nd:** | By: Supika Mashiro / Tokyo Electron Ltd.<br>Second: Larry Hartsough / U.A. Associates |
| **Discussion:** | None. |
| **Vote:** | 8-0 in favor. Motion passed. |

| | |
|---|---|
| **Motion:** | Authorize the Document for Letter Ballot in Cycle 1-24 or 2-24.<br>Revision to SEMI E72-1016, SPECIFICATION AND GUIDE FOR EQUIPMENT FOOTPRINT, HEIGHT, AND WEIGHT |
| **By / 2nd:** | By: Supika Mashiro / Tokyo Electron Ltd.<br>Second: Larry Hartsough / U.A. Associates |
| **Discussion:** | LH: timeline in mind?<br>SM: tricky, but if we can make it by Cycle 1, that would be ideal. Cycle 2 may be too close to Spring meetings |
| **Vote:** | 8-0 in favor. Motion passed. |

<u>Next Actions</u>

- Next TF meeting (11/28)
- Aiming to submit Letter Ballot draft to SEMI in 1H 2024 (ideally 1Q 2024)

**Attachment:** E72Revision TF Report to NAPIC TC_20231108

### 5.4 *Global PIC Maintenance Task Force*

Larry Hartsough (U.A. Associates) presented for this TF. Of note:

- The TF did not meet since there are no standards upcoming for Five-Year Review in the NA Chapter.
- The Japan Chapter has standards under their Five-Year Review that they will review at their meeting in Japan.
- The TF will not likely meet unless there are proposed maintenance revisions outside of the Five-Year review.

## 6 Old Business

### 6.1 *Revisit Infineon Proposal on Integrated Workflows in Failure Analysis – TFOF approval (SNARF to be sent out)*

Christian Hollerith (Infineon) presented to the TC Chapter. Of note:

- Since SEMICON West, this was presented to the Information & Control NA Chapter for the JSON side and the focus will be the sample holder in the PIC NA TC Chapter
- Reviewed the presentation as a refresher *{See attachment for file}*

<u>Open Discussion</u>

- Reviewed TFOF and made live edits in the TC Chapter
- Motion to approve TFOF was entertained

**Attachment:** Industrial Standards for Integrated Workflows within FA4.0_SEMISEMI

**Attachment:** TFOF_Integrated_Workflows_edits in TC_final

On behalf of Christian Hollerith (Infineon) :

| | |
|---|---|
| **Motion:** | Approve the TFOF for:<br>Integrated Workflows in Failure Analysis Task Force |
| **By / 2nd:** | By: laurens kwakman / LK Semiconductors Consulting Services<br>Second: Larry Hartsough / U.A. Associates |
| **Discussion:** | None |
| **Vote:** | 5-0 in favor. Motion passed. |

6.2 *Authorized Activities*

## 7 New Business

7.1 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 March 25-28, in conjunction with SEMI Standards NA Spring Meetings 2024. Schedule details TBD. Please check www.semi.org/standards for updates.

**Tentative Schedule:**

- Film Frame FOUP TF (*meet virtually prior to Spring meetings*)
- Integrated Workflows in Failure Analysis TF (*meet virtually prior to Spring meetings*)

Tuesday, March 26

- 15:00-16:00, Electron Microscopy Workflow TF
- 16:00-17:30, SEMI E72 Revision TF (day 1)

Wednesday, March 27

- 09:00-10:00, SEMI E72 Revision TF (day 2 - *tentative*)
- 10:00-12:00 Noon, PIC NA TC Chapter Meeting

Adjournment: 12:02.

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:

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

Minutes officially approved by: **PIC NA OVTCCM on XXX.**

**Table 13 Index of Available Attachments**[#1]

| *Title* | *Title* |
|---|---|
| Required Meeting Elements Nov 2022 | E72Revision TF Report to NAPIC TC_20231108 |
| [2023West] PIC NA TC Chapter Meeting Minutes FINAL | Industrial Standards for Integrated Workflows within FA4.0_SEMI |
| JA_PIC_Liaison_20231018_R0_ACT | TFOF_Integrated_Workflows_edits in TC_final |
| Staff Report Nov 2023 v3_PIC | |
| SEMI EM TF -PIC Update 8 November 2023 | |
| SNARF_FFF LP (New) | |

#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.