



Liquid Chemicals North America TC Chapter

Meeting Summary and Minutes

NA Standards Winter Meetings 2021

February 17-18, 2021, 10:00 – 11:30 Pacific

via Official Virtual TC Chapter Meeting (OVTCCM)

TC Chapter Announcements

Next TC Chapter Meeting

NA Standards Summer Meetings 2021

June 23-24, 2021, 10:00 – 11:30 Pacific

via Official Virtual TC Chapter Meeting (OVTCCM)

Table 1 Meeting Attendees

Co-Chairs: Steve Rogers (KMG Chemicals), Don E. Hadder (Intel), Koh Murai (Mega Fluid Systems), Laura Ledenbach (Evonik)

SEMI Staff: Laura Nguyen

<i>Company</i>	<i>Last</i>	<i>First</i>	<i>Company</i>	<i>Last</i>	<i>First</i>
3M	Fritz	Matt	GF Piping Systems	McIntosh	Bob
Asahi (America)	Stiles	David	Intel	Hadder	Don E.
Air Liquide Electronics	Pan	Maohua	Intel	Kerr	Paul
Camenzind Solutions	Camenzind	Mark	Intel	Tregub	Alexander
Carpenter Technology	Abraham	Akash	KMG Electronic Chemicals, Inc.	Rogers	Steven
Chemours	Farnsworth	Kimberly	KxS Technologies Oy	Kavalijer	Marcus
Chemours	McCall	Jenell	Mega Fluid Systems, Inc.	Kandiyeli	David
CT Associates, Inc.	Thomas	Jikku	Mega Fluid Systems, Inc.	Murai	Koh
CT Associates, Inc.	Van Schooneveld	Gary	Pall GmbH	Ruth	Jochen
EMD Performance Materials	Jiang	Juan	Parker Hannifin Corporation	Conner	Darren
Engineered Machinery Inc. (EMI)	Pedersen	Jim	Saint-Gobain Performance Plastics	Domy	Stephane
Evonik	Ledenbach	Laura	SUEZ	Dale	Chuck
Evoqua Water Technologies	Knapp	Alan	SUEZ Water Technologies & Solutions	Gebicke	Wolfgang
Evoqua Water Technologies	Wallin	Jill	Versum Materials	Ketkar	Suhas
FTD Solutions, LLC	Libman	Slava	SEMI	Nguyen	Laura
FTD Solutions, LLC	Marion	Bonnie	SEMI	Nguyen	Thai

Table 2 Leadership Changes

<i>WG/TF/SC/TC Name</i>	<i>Previous Leader</i>	<i>New Leader</i>
Ultra Pure Water Task Force	Slava Libman (FTD Solutions)	Bonnie Marion (FTD Solutions) Gary Van Schooneveld (CT Associates)



Table 3 Committee Structure Changes

None

Table 4 Ballot Results

<i>Document #</i>	<i>Document Title</i>	<i>Committee Action</i>
6575A	Line Item Revision to SEMI F61-0617, Guide to Design and Operation of a Semiconductor Ultrapure Water System	
L1	Update Sections 10 and 17 and Appendices 1 and 7 to align with 2020 IRDS.	Passed , with editorial change(s)
6576A	Line Item Revision to SEMI F63-0918, Guide for Ultrapure Water Used in Semiconductor Processing	
L1	Provide clarification to limitations and Table 2.	Passed , with editorial change(s)
L2	Update Table 1, including corresponding footnotes and text, to align with 2020 IRDS while also providing achievable limits with available metrology.	Passed , as balloted
6577A	Line Item Revision to SEMI F75-0617, Guide for Quality Monitoring of Ultrapure Water Used in Semiconductor Manufacturing	
L1	Update Sections 5 and 8 to align with 2020 IRDS, while also providing achievable limits with available metrology.	Passed , as balloted
6600	New Standard: Guide for Drain Segregation for Semiconductor Manufacturing Tools to Support Site Water Reuse	Passed , with technical changes, Ratification Ballot to be issued
6602	New Standard: Test Method for Determining pH of Chemical Mechanical Planarization (CMP) Slurries and Related Chemicals	Passed , with editorial change(s)
6603	Revision to SEMI F98-0618, Guide for Water Reuse in Semiconductor Industry	Passed , with editorial change(s)
6645A	Revision to SEMI F40-0699E (Reapproved 0918), Practice for Preparing Liquid Chemical Distribution Components for Chemical Testing, with title change to: Practice for Preparing Liquid Chemical Distribution Components and Neat Polymers for Chemical Testing	Passed , as balloted
6646	New Standard: Guide for Reporting Density and Porosity of the Chemical Mechanical Planarization (CMP) Pads used in Semiconductor Manufacturing	Passed , with editorial change(s)
6652	Line Item Revision to SEMI F39-0315, Guide for Chemical Blending Systems	
L1	Add Reference to SEMI E49.2 in § 4.1 and update to § 6.5 and 9.	Passed , as balloted
L2	Add “carboy” to bulleted list in § 7.1.	Passed , as balloted

#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

<i>#</i>	<i>Type</i>	<i>SC/TF/WG</i>	<i>Details</i>
6645	SNARF/ Ballot Authorization	High Purity Polymer Material & Components TF	Revision to SEMI F40-0699E (Reapproved 0918), Practice for Preparing Liquid Chemical Distribution Components for Chemical Testing, with title change to: Practice for Preparing Liquid Chemical Distribution Components and Neat Polymers or Chemical Testing – <i>TC Member Review took place between 03/11/2020-03/25/2020</i> – <i>Approved by GCS on 04/30/2020</i>



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

#	Type	SC/TF/WG	Details
6646	SNARF	Chemical Mechanical Planarization Consumables (CMP-C) TF	New Standard: Guide for Reporting Density of the Chemical Mechanical Planarization (CMP) Pads used in Semiconductor Manufacturing – <i>TC Member Review took place between 04/10/2020-04/24/2020</i> – <i>Approved by GCS on 05/07/2020</i>
6489	Ballot Authorization	CMP-C TF	New Standard: Guide for Reporting Chemical Mechanical Planarization (CMP) Polishing Pads Hardness Used in Semiconductor Manufacturing – <i>Approved by GCS on 04/30/2020</i>
6652	SNARF/ Ballot Authorization	High Purity Liquid Assemblies & System TF	Line Item Revision to SEMI F39-0315, Guide for Chemical Blending Systems – <i>Approved by GCS on 05/21/2020</i>
6653	SNARF	Ultra Pure Water TF	Revision to SEMI F61-0617, Guide to Design and Operation of a Semiconductor Ultrapure Water System
6654			Revision to SEMI F63-0918, Guide for Ultrapure Water Used in Semiconductor Processing
6655			Revision to SEMI F75-0617, Guide for Quality Monitoring of Ultrapure Water Used in Semiconductor Manufacturing – <i>TC Member Review took place between 05/01/2020-05/14/2020</i> – <i>Approved by GCS on 05/21/2020</i>
--	Adjudication Locale Transfer	Liquid Chemicals NA TC	Transfer responsibilities for Letter Ballot review from the North America Chapter to the Japan Chapter for NA Ballots 6489, 6575, 6576, 6577, 6606, and 6645. – <i>Approved by GCS on 07/29/2020</i>
6603	Ballot Authorization	Water Management TF	Revision to SEMI F98-0618, Guide for Water Reuse in Semiconductor Industry – <i>Approved by GCS on 08/12/2020</i>
6646	SNARF Revision/ Ballot Authorization	CMP-C TF	New Standard: Guide for Reporting Density and Porosity of the Chemical Mechanical Planarization (CMP) Pads used in Semiconductor Manufacturing – <i>TC Member Review took place between 08/02/2020-08/16/2020</i> – <i>Approved by GCS on 09/09/2020</i>
6602	SNARF Revision/ Ballot Authorization	CMP-C TF	New Standard: Test Method for Determining pH of Chemical Mechanical Planarization (CMP) Slurries and Related Chemicals – <i>TC Member Review took place between 08/04/2020-08/17/2020</i> – <i>Approved by GCS on 09/09/2020</i>
6677	SNARF/Ballot Authorization	CMP-C TF	New Standard: Guide for Reporting Performance Parameters of the Chemical Mechanical Planarization (CMP) Conditioning Disks used in Semiconductor Manufacturing – <i>TC Member Review took place between 08/17/2020-08/28/2020</i> – <i>Approved by GCS on 09/09/2020</i>
6600	Ballot Authorization	Water Management TF	New Standard: Guide for Drain Segregation for Semiconductor Manufacturing Tools to Support Site Water Reuse – <i>Approved by GCS on 09/09/2020</i>
6653	Ballot Authorization	Ultra Pure Water TF	Revision to SEMI F61-0617, Guide to Design and Operation of a Semiconductor Ultrapure Water System

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

#	Type	SC/TF/WG	Details
6654			Revision to SEMI F63-0918, Guide for Ultrapure Water Used in Semiconductor Processing
6655			Revision to SEMI F75-0617, Guide for Quality Monitoring of Ultrapure Water Used in Semiconductor Manufacturing – <i>Approved by GCS on 09/09/2020</i>
6645A	Ballot Authorization	High Purity Polymer Material & Components TF	Revision to SEMI F40-0699E (Reapproved 0918), Practice for Preparing Liquid Chemical Distribution Components for Chemical Testing, with title change to: Practice for Preparing Liquid Chemical Distribution Components and Neat Polymers or Chemical Testing – <i>Approved by GCS on 09/09/2020</i>
--	Special online ballot for OVTCCM	Liquid Chemicals GTC	Authorizing the special online ballot for adoption of OVTCCM. – <i>Approved by GCS on 11/24/2020</i>
6713	SNARF/ Ballot Authorization	High Purity Polymer Material & Components TF	Line Item Revision to SEMI C90-1015, Test Method and Specification for Testing Perfluoroalkoxy (PFA) Materials Used in Liquid Chemical Distribution Systems – <i>Approved by GCS on 01/22/2021</i>
6714	SNARF	Water Management TF	Line Item Revision to SEMI C93-0620, Guide for Determining the Quality of Ion Exchange Resin Used in Polish Applications of Ultrapure Water System – <i>Approved by GCS on 01/22/2021</i>
6715	SNARF	Water Management TF	New Standard: Guide for Measuring Particle Precursors in Ultrapure Water – <i>TC Member Review took place between 01/06/2021-02/20/2021</i> – <i>Approved by GCS on 01/22/2021</i>
6716	SNARF	Water Management TF	Revision to SEMI C79-0819, Guide to Evaluate the Efficacy of Sub-15 nm Filters Used in Ultrapure Water (UPW) Distribution Systems – <i>TC Member Review took place between 01/06/2021-02/20/2021</i> – <i>Approved by GCS on 01/22/2021</i>

Table 6 Authorized Activities

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

#	Type	SC/TF/WG	Details
6727	SNARF	Chemical Analytical Methods (CAM) TF	Line Item Revision to SEMI C96-0618: Test Method for Determining Density of Chemical Mechanical Polish (CMP) Slurries, with title change to: Test Method for Determining Density of Chemical Mechanical Planarization (CMP) Slurries
6728	SNARF	CAM TF	Line Item Title Revision to SEMI C99-0320: Test Method for Determining Conductivity of Chemical Mechanical Polish (CMP) Slurries and Related Chemicals, with title change to: Test Method for Determining Conductivity of Chemical Mechanical Planarization (CMP) Slurries and Related Chemicals

#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

#	When	TF	Details
R6600	Cycle 3-2021	Water Management TF	New Standard: Guide for Drain Segregation for Semiconductor Manufacturing Tools to Support Site Water Reuse
6465	Cycle 3-2021	CAM TF	Line Item Revision for SEMI C36-1213, Specifications for Phosphoric Acid, to correct nonconforming title to “Specification for Phosphoric Acid”
6677	Cycle 3-2021	CMP-C TF	New Standard: Guide for Reporting Performance Parameters of the Chemical Mechanical Planarization (CMP) Conditioning Disks used in Semiconductor Manufacturing
6727	Cycle 3-2021	CAM TF	Line Item Revision to SEMI C96-0618: Test Method for Determining Density of Chemical Mechanical Polish (CMP) Slurries, with title change to: Test Method for Determining Density of Chemical Mechanical Planarization (CMP) Slurries
6728	Cycle 3-2021	CAM TF	Line Item Title Revision to SEMI C99-0320: Test Method for Determining Conductivity of Chemical Mechanical Polish (CMP) Slurries and Related Chemicals, with title change to: Test Method for Determining Conductivity of Chemical Mechanical Planarization (CMP) Slurries and Related Chemicals
6729	Cycle 3-2021	High Purity Polymer Materials & Components TF	Line Item Revision to SEMI F57-0120, Specification for Polymer Materials and Components Used in Ultrapure Water and Liquid Chemical Distribution Systems

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

#	TF	Title	Expiration Date
6315	CAM TF	Line Item Revision to SEMI C30-0218, Specification for Hydrogen Peroxide	02/17/2022
6388	CAM TF	Revision to SEMI C44-0618, Specification and Guide for Sulfuric Acid	02/17/2022

Table 9 SNARF(s) Abolished

#	TF	Title
6561	High Purity Polymer Materials & Components TF	Line Item Revision to SEMI F40-0699E (Reapproved0918) Practice for Preparing Liquid Chemical Distribution Components for Chemical Testing – <i>Abandon SNARF. Reissued new SNARF due to scope change.</i>
6653	Ultra Pure Water TF	Revision to SEMI F61-0617, Guide to Design and Operation of a Semiconductor Ultrapure Water System – <i>Abandon SNARF. Kept original SNARF.</i>
6654	Ultra Pure Water TF	Revision to SEMI F63-0918, Guide for Ultrapure Water Used in Semiconductor Processing – <i>Abandon SNARF. Kept original SNARF.</i>
6655	Ultra Pure Water TF	Revision to SEMI F75-0617, Guide for Quality Monitoring of Ultrapure Water Used in Semiconductor Manufacturing – <i>Abandon SNARF. Kept original SNARF.</i>

Table 10 Standard(s) to receive Inactive Status

None

Table 11 New Action Items

<i>Item #</i>	<i>Assigned to</i>	<i>Details</i>
2021Feb#01	Laura Nguyen	Ask NA Gases to take over SEMI C64. Ongoing.
2021Feb#02	Laura Nguyen, Alex Tregub	Submit SEMIViews access to Alex Tregub for SEMI C64. Alex will ask within his company for assistance. Completed. Closed.
2021Feb#03	Laura Nguyen	Find ballot results for Ballot 6315. Completed. Closed

Table 12 Previous Meeting Action Items

<i>Item #</i>	<i>Assigned to</i>	<i>Details</i>
2019Nov#01	Bob M.	Prepare SNARF for SEMI F48 by Spring 2020 meetings. Document is due for 5 year review. Ongoing.
2019Nov#02	Don H., Laura L.	Follow up with Tony S. on SEMI C10 revision/reapproval recommendation and SNARF if necessary, by Spring 2020 meetings. Document is due for 5 year review. Ongoing.
2019Nov#03	Koh M.	Prepare SNARF for SEMI F39 by Spring 2020 meetings. Completed. Closed.
2019Nov#04	Inna S.	Add Bonnie Marion to the newly formed Water Management TFOF roster. Completed. Closed.

1 Welcome, Reminders, and Introductions

Steven Rodgers (KMG Electronic Chemicals, Inc.) called the meeting to order at 10:12 on Wednesday, February 17, 2021 and at 10:10 on Thursday, February 18, 2021. 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 (File name: Required Element Nov 2020 Rev1)

2 Review of Previous Meeting Minutes

The TC Chapter reviewed the minutes of the previous meeting on Wednesday, February 17, 2021.

Motion: To accept the previous meeting minutes as written.

By / 2nd: By: Koh Murai / Mega Fluid Systems, Inc.
Second: Bob McIntosh / GF Piping Systems

Discussion: None.

Vote: 15-0 in favor. Motion passed.

Attachment: Fall 2019 Liquid Chemicals TC meeting minutes_v2

3 Liaison Reports

3.1 Liquid Chemicals Europe TC Chapter

- No update.
- Staff Contact: James Amano (jamano@semi.org)

3.2 Liquid Chemicals Japan TC Chapter

Laura Nguyen (SEMI) reported for the Liquid Chemicals Japan TC Chapter. Of note:

Meeting Information

- Last meeting



- January 29, 2020
 - SEMI Japan, Tokyo, Japan
 - Official Virtual TC Chapter Meeting
- Next meeting
 - June 18, 2021
 - SEMI Japan, Tokyo, Japan
 - Official Virtual TC Chapter Meeting

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

Staff Contact: Hirofumi Kanno (hkanno@semi.org)

Attachment: JA_LC_Liaison_2020212_v1

3.3 SEMI Staff Report

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

SEMI Global Calendar of Events

- SEMICON China (March 17-19, 2021; Shanghai, China)
- SEMICON Southeast Asia (May 18-20, 2021; Penang, Malaysia)
- SEMICON Taiwan (Sept 8-10, 2021; Taipei, Taiwan)
- SEMICON West (December 7-9, 2021; [Hybrid] San Francisco, CA)

Critical Dates for SEMI Standards Ballots

- Cycle 1-2021: Ballot Submission Due: Jan 5/Voting Period: Jan 19 – Feb 18
- Cycle 2-2021: Ballot Submission Due: Jan 29/Voting Period: Feb 10 – Mar 12
- Cycle 3-2021: Ballot Submission Due: Mar 9/Voting Period: Mar 23 – Apr 22
- Cycle 4-2021: Ballot Submission Due: Apr 14/Voting Period: Apr 28 – May 28
- Cycle 5-2021: Ballot Submission Due: May 18/Voting Period: June 1 – July 1
- Cycle 6-2021: Ballot Submission Due: Aug 3/Voting Period: Aug 17 – Sept 16

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 2020	1	2	0	0
December 2020	1	3	3	0
January 2020	0	1	6	0

Total in portfolio – 1,029 (includes 274 Inactive Standards)

New Standards

<i>Cycle</i>	<i>Designation</i>	<i>Title</i>	<i>Committee</i>	<i>Region</i>
November 2020	SEMI C100	Guide for Reporting Chemical Mechanical Planarization (CMP) Polishing Pads Hardness Used in Semiconductor Manufacturing	Liquid Chemicals	NA
December	SEMI PV97	Specification for Silicon Powder 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	26
MEMS	3
Metrics	12
Micropatterning	30
Photovoltaic	1
Physical Interfaces & Carriers	19
Silicon Wafer	11
Traceability	8

Regulations & Procedure Manual

- *Regulations* (November 5, 2020)
 - Clarification on § 6.5, Disbandment of a TC Chapter
 - Requires an RSC to disband a TC Chapter when it is shown to be inactive by failing to:
 - hold meetings for two consecutive years,
 - report activity to its RSC for two consecutive years, or
 - initiate new Standards Documents activities.
- *Procedure Manual* (November 5, 2020)
 - New § 6.1.3.4.1 defining detailed procedures for disbandment of inactive TC Chapters.

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

Nonconforming Titles (See PM Appendix 4)

- SEMI C23-0714 (Reapproved 0620), Specifications for Buffered Oxide Etchants
 - See *Procedure Manual* ¶A4-1.8.
- *SEMI C33-0213, Specifications for n-Methyl 2-Pyrrolidone
- *SEMI C36-1213, Specifications for Phosphoric Acid



- *SEMI C64-0308 (Reapproved 1214), SEMI Statistical Guidelines for Ship To Control
 - See *Procedure Manual* Table A4-2-1
- * = Up for Five-Year Review

Five-Year Review

- *SEMI C33-0213, Specifications for n-Methyl 2-Pyrrolidone
- SEMI F31-0313, Guide for Bulk Chemical Distribution Systems
- SEMI C24-0813, Specification for n-Butyl Acetate
- *SEMI C36-1213, Specifications for Phosphoric Acid
- SEMI C10-1109 (Reapproved 1114), Guide for Determination of Method Detection Limits
- SEMI F48-0600 (Reapproved 1214), Test Method for Determining Trace Metals in Polymer Materials
- *SEMI C64-0308 (Reapproved 1214), SEMI Statistical Guidelines for Ship To Control
- SEMI C87-0515, Test Method for Determining Roughness of Polymer Surfaces Used in Ultrapure Water and Liquid Chemical Distribution Systems by Contact Profilometry
- SEMI C31-0615, Specification for Methanol

Note: SEMI C33, F31, C24 – categorized incorrectly

SNARF 3 Year Status, TC Chapter may grant a one-year extension

- 6315, Line Item Revision to SEMI C30-0218, Specification for Hydrogen Peroxide
 - SNARF date: 11/17/2017
- 6388, Revision to SEMI C44-0618, Specification and Guide for Sulfuric Acid
 - SNARF date: 04/10/2018
- 6451, Revision to SEMI C1-0310 (Reapproved 0618), Guide for the Analysis of Liquid Chemicals
 - SNARF Date: 07/10/2018
- 6465, Line item Revision for SEMI C36-1213, Specifications for Phosphoric Acid, to correct nonconforming title to: Specification for Phosphoric Acid
 - SNARF date: 11/10/2018

SNARF(s) Approved by GCS in between TC Chapter Meetings

- See Table 5.

Action Item: 2021Feb#01, Laura to ask NA Gases about SEMI C64.

2021Feb#02, Laura to submit SEMIViews access to Alex Tregub for SEMI C64. Alex will ask within his company for assistance.

2021Feb#03, Laura to find ballot results for Ballot 6315.

Attachment: Staff Report Feb 2021_LChem v2

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 # 6575A, Line Item Revision to SEMI F61-0617, Guide to Design and Operation of a Semiconductor Ultrapure Water System

4.1.1 Line Item #1: Update Sections 10 and 17 and Appendices 1 and 7 to align with 2020 IRDS.

- The ballot passed TC Chapter review with editorial changes. See attachment for ballot adjudication.

Attachment: 6575A_ProceduralReview

4.2 Document # 6576A, Line Item Revision to SEMI F63-0918, Guide for Ultrapure Water Used in Semiconductor Processing

4.2.1 Line Item #1: Provide clarification to limitations and Table 2.

- The ballot passed TC Chapter review with editorial changes. See attachment for ballot adjudication.

4.2.2 Line Item #2: Update Table 1, including corresponding footnotes and text, to align with 2020 IRDS while also providing achievable limits with available metrology

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

Attachment: 6576A_ProceduralReview

4.3 Document # 6577A, Line Item Revision to SEMI F75-0617, Guide for Quality Monitoring of Ultrapure Water Used in Semiconductor Manufacturing

4.3.1 Line Item #1: Update Sections 5 and 8 to align with 2020 IRDS, while also providing achievable limits with available metrology.

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

Attachment: 6577A_ProceduralReview

4.4 Document # 6600, New Standard: Guide for Drain Segregation for Semiconductor Manufacturing Tools to Support Site Water Reuse

- The ballot passed TC Chapter review with technical changes. Ratification Ballot to be issued. See attachment for ballot adjudication.

Attachment: 6600_ProceduralReview

Motion: Approve R6600 for Cycle 3-2021.

By / 2nd: By: Paul Kerr / Intel Corporation
Second: Chuck Dale / SUEZ

Discussion: None.

Vote: 11-0 in favor. Motion passed.

4.5 Document # 6602, New Standard: Test Method for Determining pH of Chemical Mechanical Planarization (CMP) Slurries and Related Chemicals

- The ballot passed TC Chapter review with editorial changes. See attachment for ballot adjudication.

Attachment: 6602_ProceduralReview

4.6 Document # 6603, Revision to SEMI F98-0618, Guide for Water Reuse in Semiconductor Industry

- The ballot passed TC Chapter review with editorial changes. See attachment for ballot adjudication.

Attachment: 6603_ProceduralReview

4.7 Document # 6645A, Revision to SEMI F40-0699E (Reapproved 0918), Practice for Preparing Liquid Chemical Distribution Components for Chemical Testing, with title change to: Practice for Preparing Liquid Chemical Distribution Components and Neat Polymers for Chemical Testing

- The ballot passed as balloted. See attachment for ballot adjudication.

Attachment: 6645A_ProceduralReview

4.8 Document # 6646, New Standard: Guide for Reporting Density and Porosity of the Chemical Mechanical Planarization (CMP) Pads used in Semiconductor Manufacturing

- The ballot passed TC Chapter review with editorial changes. See attachment for ballot adjudication.

Attachment: 6646_ProceduralReview

4.9 Document # 6652, Line Item Revision to SEMI F39-0315, Guide for Chemical Blending Systems

4.9.1 Line Item #1: Add Reference to SEMI E49.2 in § 4.1 and update to § 6.5 and 9.

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

4.9.2 Line Item #2: Add “carboy” to bulleted list in § 7.1.

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

Attachment: 6652_ProceduralReview

5 Subcommittee and Task Force Reports

5.1 *Ultrapure Water & Water Management Task Force*

Bonnie Marion (FTD Solutions, LLC) reported for the UPW & Water Management Task Force jointly. Of note:

Winter 2021, Water Mgmt & UPW Task Forces Update

- Main theme: Proactive Yield management from UPW IRDS to SEMI UPW TF, supporting IDMs and their supply chain
 - Recorded 4 webinars on Proactive Technology Management
 - Yield Workshops held in Feb. & Sept. 2020
 - This year’s Spring “Kickoff” scheduled for March 4 & 8, 2021 (agenda on upcoming activities slide)
- Four documents passed ballot (ready for adjudication)
 - SEMI F63 – UPW Quality
 - SEMI F61 – UPW System Design and Operation
 - SEMI F75 – UPW Metrology
 - SEMI F98 – Water Reuse Guide
- Developed new document 6600 – Guide For Drain Segregation For Semiconductor Manufacturing Tools To Support Site Water Reuse (Ready for vote on technical change, followed by ratification ballot in Cycle 3)

Task Force Roster {See attachment for full list}

SNARFs {See attachment for file}



- C79 – Guide to Evaluate the Efficacy of Sub-15 nm Filters Used in UPW Distribution Systems
- **C93** – Guide for Determining the Quality of Ion Exchange Resin Used in Polish Applications of Ultrapure Water System
- **New Document** – Guide for Measuring Particle Precursors in Ultrapure Water

UPW Ballot Activity Summary – F61, F63, F75 *{See attachment for ballot results}*

Water Reuse Ballot Activity Summary – Document 6600, F98 *{See attachment for ballot results}*

Upcoming Activities

- Updated UPW TF leadership – Co-chairs: Bonnie Marion (FTD) and Gary Van Schooneveld (CT Associates)
- Plans for 2021 SNARFs
 - SEMI C93 – Line Item Revisions
 - SEMI C79 – Additional challenge tests
 - New Document 6715 – Measurement of Particle Precursors
- Supporting Ultrapure Micro (UPM) 2021
 - Will present regular update on SEMI Standards
- Yield Workshop: March 4 & 8, 2021, 8-11 am Pacific Time
 - Day 1: Drivers, risks, plans to address questions to support the roadmap deliverables
 - Introduction - end-in-mind: perspective on the gap that we YE need to address - (20 min)
 - Presentations about the technology drivers and the industry needs - 4 x 15 min
 - Breakout discussion to come up with the sub-team specific implications - 70min (wet and dry)
 - Day 2: Alignment on the rules, methodologies, boundaries, process
 - Pathways of contamination and contamination control - integrated approach - 30 min
 - Each sub-team to share how the process can help them to achieve the goal and what differences may be required - 20 min x 5 = 100 min
 - Wrap-up - 20min - next steps, next workshop

Task Force Meeting Schedule

- Date: bi-weekly (has been weekly to start)
- Time: 9am PST on Thursdays
- Location/teleconferencing information – Microsoft Teams link to be provided
- Contact: Bonnie Marion, bmarion@ftdsolutions.net; Gary Van Schooneveld, gary@ctassociatesinc.com

Task Force leadership change request

Motion: Approve Bonnie Marion (FTD) and Gary Van Schooneveld (CT Associates) as new UPW TF leaders, and Slava stepping down.

By / 2nd: By: Koh Murai / Mega Fluid Systems, Inc.
Second: Chuck Dale / SUEZ

Discussion: None.

Vote: 11-0 in favor. Motion passed.



Attachment: SEMI Stds TF Report_UPW 2021 Winter

5.2 Chemical Analytical Methods (CAM) Task Force

David Kandiyeli (Mega Fluid Systems, Inc.) reported for the CAM Task Force. This report contained information on the below.

Task Force Roster {See attachment for full list}

TF Meeting Summary

- TF Leadership & changes (if any): There are no task force leadership changes at this time
- Standards
 - One new standard passed balloting but not published (Doc#6602; Cycle 7-2021)
 - We will vote on incorporation of editorial comments in the Technical Committee meeting

SNARFs

- New SNARFs proposals
 - Doc#..... Line Item Revision of C99-0320
 - Modify title to align with acronym used in later Doc#6602 pH probe test method
 - Doc#.....Line Item Revision of C96-0618
 - Modify title to align with acronym used in later Doc#6602 pH probe test method
- Revised SNARFs proposals
 - SNARF 6315: Line Item Revision to SEMI C30-0218, Specification for Hydrogen Peroxide
 - This document is being revised to align with the IRDS roadmap.
 - SNARF 6388: Revision to SEMI C44-0618, Specification and Guide for Sulfuric Acid
 - Document new standard methods with greater sensitivity in alignment with IRDS
- Revised SNARFs proposals
 - SNARF 6451: Revision to SEMI C1-0310 (Reapproved 0618), Guide for the Analysis of Liquid Chemicals
 - Semiconductor Fabs are starting to demand specifications of 50, 20, 10 and even one part-per-trillion (ppt) for trace metals in liquid chemicals. The analysis of liquid chemicals with specifications below about 50ppt by different laboratories will not agree unless a common methodology is used to eliminate instrument and method differences across laboratories analyzing the same material. Analytical disagreements arise because each laboratory has unique instrument conditions and preparation methods that can drastically affect the final result, where one lab says it meets specification and another says it doesn't. Analytical disagreements are common but this is a very large problem with specifications below about 50 ppt. The analytical differences can arise from numerous sources: sampling, sample preparation, instrument configuration, ICP-MS analysis conditions (i.e., integration times), data reduction, etc.
 - SNARF 6465: Line Item Revision for SEMI C36-1213, Specifications for Phosphoric Acid, to correct nonconforming title to "Specification for Phosphoric Acid"
 - Nonconforming title will be corrected as part of document 5 Year review/approval
 - SNARF 6509: Revision to SEMI C64-0308 (Reapproved 1214), SEMI Statistical Guidelines for Ship to Control, with Title Change



- The semiconductor industry is continuing to mature and therefore requires more consistency from the supply chain sources. To enable this need, the criteria for which materials are allowed to be shipped to the end user IDM's for processing requires sufficient statistical process control to maintain manufacturing stability, reliability and excursion prevention.
- SNARF 6602: New Standard: Test Method for Determining pH of Chemical Mechanical Planarization (CMP) Slurries and Related Chemicals (Revision Passed GCS 9/8/2020)
 - This test method would establish a standard to determine and report the pH of chemical slurries used for CMP polishing processes and post-CMP cleaning applications.

Ballot Activity Summary

- Ballot Adjudication (No activity due to postponement of Technical Committee meetings):
 - Passed: Ballot 6602 – New Standard: Test Method for Determining pH of Chemical Mechanical Planarization (CMP) Slurries and Related Chemicals
 - Ballot Adjudicated during 2/18/2021 North American Liquid Chemicals Technical Committee Meeting
 - Failed: None
- New Ballots and ballot plans
 - Doc #XXXX - Line Item Revision of C99-0320
 - Cycle #3-2021
 - Doc # XXXX - Line Item Revision of C96-0618
 - Cycle #3-2021
- Doc #6465: Line Item Revision for SEMI C36-1213, Specifications for Phosphoric Acid, to correct nonconforming title to “Specification for Phosphoric Acid”
 - Cycle #3-2021

Meeting Results (Technical Summary)

- No activities save those required to prepare Doc#6602 for balloting in Cycle 7 of 2020.

Upcoming Activities

- Make title corrections to the unassigned SNARFs for C99-0320 & C96-0618 and submit for balloting in Cycle 3 of 2021
- Make title correction to C36 under SNARF C36-1213 and submit for balloting in Cycle 3 of 2021
- Now that SNARF 6315: Line Item Revision to SEMI C30-0218, Specification for Hydrogen Peroxide has been voted to receive a 1 year extension, contact Laura Ledenbach and establish work group to investigate alignment with IRDS specifications.

Attachment: TF Leaders TF CAM Report_Winter2021 REV002

5.3 High Purity Liquid Assemblies & Systems Task Force

This Task Force did not meet. There is no update at this time.

5.4 High Purity Polymer Materials and Components Task Force

Bob McIntosh (GF Piping Systems) reported for the High Purity Polymer Materials and Components Task Force. This report contained information on the below.

Task Force Roster *(See attachment for full list)*

TF Meeting Summary

- Date and Event
 - SEMI F57++ 2/17/21
 - SEMI C90 rev TF 2/23/21
- TF Leadership & changes (if any):
 - TF F57 Bob McIntosh GF and Archita Sengupta Intel
 - TF C90 Bob McIntosh GF and Daun Wilcox Tesla

SNARFs

- New SNARFs proposals
 - Line-item Revision to SEMI F57 - HIGH PURITY POLYMER MATERIALS AND COMPONENTS USES IN ULTRAPURE WATER AND LIQUID CHEMICAL DISTRIBUTION SYSTEMS.
 - Rationale: When SEMI 57 was last revised the requirement to analyze raw material pellets in Table 1 was left unchecked because there was not adequate direction for testing in SMEI F40. SEMI F40 has now been revised to include detailed directions on testing of components including raw material pellets. As agreed at the time once SEMI F40 was revised SEMI F57 would add the requirement to test raw material pellets
 - SNARF # 6713 SEMI C90
 - Line Item Revision to SEMI C90-1015, Test Method and Specification for Testing Perfluoroalkoxy (PFA) Materials Used in Liquid Chemical Distribution Systems
 - Rationale for revision: During the revision of SEMI F57, a number of new metals were added to the list of items to be measured for in leachable contaminants. In SEMI C90, the list of metals is Fe. In order to align the two material specifications, the list of metals should be consistent.
 - Line item ballot will modify Table 2 to expand on the number of metals to be tested for.
 - 1ST TF meeting 2/23

Ballot Activity Summary: Ballot Adjudication

- Passed: SEMI F40 REVISION
 - Doc # 6645a
- New Ballots and ballot plans
 - Doc # SEMI C90
 - Cycle # 5 or 6
 - Doc # SEMI F57
 - Cycle # 3 or 4

Meeting Results (Technical Summary)

- SEMI F57++ (6601)
 - Adjusted the tables (2 & 3) to align with SEMI F57
 - Added tables for materials used for chemicals (three columns: cleaning, IPA and peroxide)



- Identified a new requirement for organics called “critical organics” defined as having a molecular weight of about 100 and a boiling point of about 150oC (examples are cyclohexanone and cyclohexanol). This is an organic that leaves any kind of a residue on the wafer surface post cleaning.
- This new contaminant will require a new method for measurement. TF is now working on that.
- This definition of a critical organic will need to be discussed with the UPW group as they have a similar worded category but specific for particle precursors.

Upcoming Activities

- Kick of the C90 task force meetings. 2/23
- Continue to make progress on F57++ (6601)
- Once the just submitted SNARF for line item revision for F57 then kick off a TF for that.
- Review SEMI F48 to confirm it is aligned with the just revised SEMI F40 prior to opening SNARF for either revision or reapproval. It was due in 2019. I will ask the same members for F40 to participate.

Next Task Force Meeting Schedule

- **6601**
 - Date bi weekly Weds even WW’s
 - Time 0700 US west coast time
 - Location/teleconferencing information Team mtg
 - Contact Bob McIntosh bob@enviro-e.com
- **6713**
 - Date bi weekly Tues odd WW’s
 - Time 0700 US west coast time
 - Location/teleconferencing information Team mtg
 - Contact Bob McIntosh bob@enviro-e.com
- **F48** revision tbd

Attachment: High Purity Polymers Report 2a 2021_atm

5.5 Chemical Mechanical Planarization Consumables (CMP-C) Task Force

Alex Tregub (Intel) reported for the Chemical Mechanical Planarization Consumables (CMP-C) Task Force. This report contained information on the below.

Task Force Roster *[See attachment for full list]*

TF Meeting Summary

- Date and Event: February 18, 2021: CMP-C TF meeting
 - # of attendees in person: online only due to CA “stay in place” order
 - # of attendees remote/online: 6
- TF Leadership & changes (if any): No changes

SNARFs

- New SNARF proposals: None at this time

Ballot Activity Summary



- Ballot Adjudication:
 - Doc. 6646. “GUIDE FOR REPORTING DENSITY AND POROSITY OF CHEMICAL MECHANICAL PLANARIZATION (CMP) POLISHING PADS USED IN SEMICONDUCTOR MANUFACTURING”
- New Ballots and ballot plans-Review
 - Doc # 6677. “GUIDE FOR REPORTING PERFORMANCE PARAMETERS OF THE CHEMICAL MECHANICAL PLANARIZATION (CMP) CONDITIONING DISKS USED IN SEMICONDUCTOR MANUFACTURING ”

Meeting Results (Technical Summary)

- TF has made the request to authorize for distribution the ballot on “GUIDE FOR REPORTING PERFORMANCE PARAMETERS OF THE CHEMICAL MECHANICAL PLANARIZATION (CMP) CONDITIONING DISKS USED IN SEMICONDUCTOR MANUFACTURING, document 6677”
 - in the Cycle no. 3

Upcoming Activities

- Adjudicate Ballot for New Standard, Doc. 6646. “GUIDE FOR REPORTING DENSITY AND POROSITY OF CHEMICAL MECHANICAL PLANARIZATION (CMP) POLISHING PADS USED IN SEMICONDUCTOR MANUFACTURING”
- Authorize Letter Ballot for Cycle 3 on the “GUIDE FOR REPORTING PERFORMANCE PARAMETERS OF THE CHEMICAL MECHANICAL PLANARIZATION (CMP) CONDITIONING DISKS USED IN SEMICONDUCTOR MANUFACTURING ”.
- Identify next topics for the Guides for CMP solid consumables:
 - CMP Pad windows for windowed pads
 - CMP retainer rings

Next TF Meeting Schedule

- **Date** : recurring biweekly meetings of the TF members
- **Time**: Every Thursday of the even week, 9 to 10 am PST
- **Location/teleconferencing information**:
- MS Teams meetings: **⇒ Join on your computer or mobile app**
- [Click here to join the meeting](#)
- **Contact**: alexander.tregub@intel.com; 408 653 9408

Attachment: CMP-C TF Leaders TF Report _February 2021_inn_2

6 Old Business

6.1 Abandon SNARF(s)

- See Table 9 for details.

Motion: Abandon SNARF Document 6653: Revision to SEMI F61-0617, Guide to Design and Operation of a Semiconductor Ultrapure Water System

By / 2nd: By: Bonnie Marion / FTD Solutions LLC
Second: Bob McIntosh / GF Piping Systems

Discussion: None.

Vote: 8-0 in favor. Motion passed.



Motion: Abandon SNARF Document 6654: Revision to SEMI F63-0918, Guide for Ultrapure Water Used in Semiconductor Processing.

By / 2nd: By: Bonnie Marion / FTD Solutions LLC
Second: Bob McIntosh / GF Piping Systems

Discussion: None.

Vote: 10-0 in favor. Motion passed.

Motion: Abandon SNARF Document 6655, Revision to SEMI F75-0617, Guide for Quality Monitoring of Ultrapure Water Used in Semiconductor Manufacturing.

By / 2nd: By: Koh Murai / Mega Fluid Systems, Inc.
Second: Bob McIntosh / GF Piping Systems

Discussion: None.

Vote: 9-0 in favor. Motion passed.

Motion: Abandon SNARF Document 6561 — Line Item Revision to SEMI F40-0699E (Reapproved 0918) Practice for Preparing Liquid Chemical Distribution Components for Chemical Testing [To be abandoned due to scope change]

By / 2nd: By: Jim Pedersen / Engineered Machinery Inc. (EMI)
Second: Bob McIntosh / GF Piping Systems

Discussion: None.

Vote: 7-0 in favor. Motion passed.

6.2 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 Authorized Activities/Ballots

- See Tables 6 and 7 for details.

Motion: Approve the SNARF: Line Item Title Revision to SEMI C99-0320: Test Method for Determining Conductivity of Chemical Mechanical Polish (CMP) Slurries and Related Chemicals, with title change to: Test Method for Determining Conductivity of Chemical Mechanical Planarization (CMP) Slurries and Related Chemicals

By / 2nd: By: David Kandiyeli / Mega Fluid Systems, Inc.
Second: Koh Murai / Mega Fluid Systems, Inc.

Discussion: None.

Vote: 8-0 in favor. Motion passed.

Attachment: SNARF_C99 (Line Item)

Motion: Approve SNARF: Line Item Revision to SEMI C96-0618: Test Method for Determining Density of Chemical Mechanical Polish (CMP) Slurries, with title change to: Test Method for Determining Density of Chemical Mechanical Planarization (CMP) Slurries

By / 2nd: By: Bob McIntosh / GF Piping Systems
Second: Koh Murai / Mega Fluid Systems, Inc.

Discussion: None.

Vote: 8-0 in favor. Motion passed.



Attachment: SNARF_C96 (Line Item)

Motion: Authorize the Document for Letter Ballot for Cycle 3-2021
>Line Item to SEMI C99
>Line Item to SEMI C96
>SNARF 6465: Line Item Revision for SEMI C36-1213, Specifications for Phosphoric Acid, to correct nonconforming title to "Specification for Phosphoric Acid"

By / 2nd: By: Bob McIntosh / GF Piping Systems
Second: David Kandiyeli / Mega Fluid Systems, Inc.

Discussion: None.

Vote: 4-0 in favor. Motion passed.

Motion: Approve the SNARF for: Line Item Revision to SEMI F57-0120, Specification for Polymer Materials and Components Used in Ultrapure Water and Liquid Chemical Distribution Systems, and Ballot for Cycle 3-2021.

By / 2nd: By: Jill Wallin / Evoqua Water Technologies LLC
Second: Gary Van Schooneveld / CT Associates, Inc

Discussion: None.

Vote: 6-0 in favor. Motion passed.

Attachment: SNARF_F57 (Line Item)

Motion: Authorize the Document 6677, New Standard: Guide for Reporting Performance Parameters of the Chemical Mechanical Planarization (CMP) Conditioning Disks used in Semiconductor Manufacturing, for Letter Ballot in Cycle 3-2021.

By / 2nd: By: Bob McIntosh / GF Piping Systems
Second: David Kandiyeli / Mega Fluid Systems, Inc.

Discussion: None.

Vote: 6-0 in favor. Motion passed.

7.2 SNARF(s) Granted a One-Year Extension

- See Table 8 for details.

Motion: Approve a 1 year extension of the project period for the SNARF 6315.

By / 2nd: By: Koh Murai / Mega Fluid Systems, Inc.
Second: Bob McIntosh / GF Piping Systems

Discussion: None.

Vote: 9-0 in favor. Motion passed.

Motion: Approve a 1 year extension of the project period for the SNARF 6388.

By / 2nd: By: Bob McIntosh / GF Piping Systems
Second: Koh Murai / Mega Fluid Systems, Inc.

Discussion: None.

Vote: 9-0 in favor. Motion passed.



8 Next Meeting and Adjournment

The next meeting is scheduled for June 23-24, 2021, TBD. See <http://www.semi.org/standards-events> for the current list of events.

Adjournment: Wednesday, February 17, 2021, at 11:50; Thursday, February 18, 2021, at 12:09.

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:

Steve Rogers (KMG Chemicals), Co-chair	<Date approved>
Don Hadder (Intel), Co-chair	<Date approved>
Koh Murai (Mega Fluid Systems), Co-chair	<Date approved>
Laura Ledenbach (Evonik), Co-chair	<Date approved>

Minutes approved by: **Liquid Chemicals NA OVTCCM on June 23, 2021.**

Table 13 Index of Available Attachments^{#1}

<i>Title</i>	<i>Title</i>
Required Element Nov 2020 Rev1	6645A_ProceduralReview
Fall 2019 Liquid Chemicals TC meeting minutes_v2	6646_ProceduralReview
JA_LC_Liaison_2020212_v1	6652_ProceduralReview
Staff Report Feb 2021_LChem v2	SEMI Stds TF Report_UPW 2021 Winter
6575A_ProceduralReview	TF Leaders TF CAM Report_Winter2021 REV002
6576A_ProceduralReview	High Purity Polymers Report 2a 2021_atm
6577A_ProceduralReview	CMP-C TF Leaders TF Report _February 2021_Inn_2
6600_ProceduralReview	SNARF_C96 (Line Item)
6602_ProceduralReview	SNARF_C99 (Line Item)
6603_ProceduralReview	SNARF_F57 (Line Item)

#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.