



Liquid Chemicals North America TC Chapter

Meeting Summary and Minutes

SEMICON West 2017

July 11, 2017 14:00 – 17:00

Marriott Marquis Hotel, San Francisco, California

TC Chapter Announcements

Next TC Chapter Meeting

November 7, 2017 14:00 – 17:00
SEMI HQ, Milpitas, CA

Table 1 Meeting Attendees

Italics indicate virtual participants

Co-Chairs: Don Hadder (Intel); Frank Flowers (Peroxy Chemicals)

SEMI Staff: Inna Skvortsova

<i>Company</i>	<i>Last</i>	<i>First</i>	<i>Company</i>	<i>Last</i>	<i>First</i>
Intel	Hadder	Don	Mega Fluid Systems	Murai	Koh
K-Patents, Inc	Kavaljer	Marcus	Mega Fluid Systems	Kandiyeli	David
Peroxy Chemicals	Flowers	Frank	GE	Dale	Chuck
GF Piping Systems	McIntosh	Bob	Rikutec	Reinig	Gerd
FDT Solutions	Libman	Slava	Air Liquide	Mey-Ami	Lisa
KMG Electronic Chemicals	Rogers	Steven	Solvay	Terracina	Vincent
Ichor Systems	Melcer	Chris	Air Liquide	Gotts	Hugh
Swagelok	Shutler	Bob	Valex	D'Addario	Mike
Peroxy Chemicals	Rego	Rebecca	SEMI	Skvortsova	Inna
			SEMI	Amano	James

Table 2 Leadership Changes

<i>WG/TF/SC/TC Name</i>	<i>Previous Leader</i>	<i>New Leader</i>
High Purity Liquid Assemblies and Systems TF		David Kandiyeli (MegaFluids Systems) - new
Chemical Analytical Methods TF		David Kandiyeli (MegaFluids Systems) - new

Table 3 Committee Structure Changes

<i>Previous WG/TF/SC Name</i>	<i>New WG/TF/SC Name or Status Change</i>
NONE	



Table 4 Ballot Results

Document #	Document Title	Committee Action
5831B	Revision to SEMI C27-0708, <i>Specifications and Guideline for Hydrochloric Acid with title change to: Specification and Guide for Hydrochloric Acid</i>	Passed
5642A	Revision to SEMI C35-0708, <i>Specifications and Guideline for Nitric Acid with title change to: Specification and Guide for Nitric Acid</i>	Passed
6173	Line Item Revision to SEMI C30-1110, <i>Specifications for Hydrogen Peroxide</i> , to correct nonconforming title to: <i>Specification for Hydrogen Peroxide</i>	Passed

#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

#	Type	SC/TF/WG	Details
6195	SNARF	HPPM & C TF	Revision to SEMI F104-0312 <i>Particle Test Method for Evaluation of Components Used in Ultrapure Water and Liquid Chemical Distribution Systems</i> , with title change to correct nonconforming title. Approved by GCS 05/09/2017

Table 6 Authorized Activities

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

#	Type	SC/TF/WG	Details
6256	SNARF	Precursor Specifications TF (EU Chapter)	Reapproval of SEMI C81-0113, <i>Guide for Tris(Dimethylamino) Silane (3DMAS)</i>
6254	SNARF	CAM	Reapproval of SEMI C62-0309, <i>Specification for Porogen Precursors Used in Low K CVD Processes</i>
6255	SNARF	CAM	Reapproval of SEMI C63-1108, <i>Specification for Organosilicate Precursors Used in Low K CVD Processes</i>
6251	SNARF	CAM	Line-item Revision to SEMI C45-0309E, <i>Specification and Guideline for Tetraethylorthosilicate (TEOS)</i> , to correct nonconforming title
6250	SNARF	CAM	Line-item Revision to SEMI C29-1110, <i>Specifications and Guide for 4.9% Hydrofluoric Acid (10:1 v/v)</i> to correct nonconforming title
6253	SNARF	CAM	Reapproval of SEMI C40-1110, <i>Specification for Potassium Hydroxide, 45% Solution</i>
6252	SNARF	CAM	Reapproval of SEMI C1-0310, <i>Guide for the Analysis of Liquid Chemicals</i>
6257	SNARF	CAM	Reinstatement of SEMI F34-0998, <i>Guide for Liquid Chemical Pipe Labeling</i> <to distribute to GCS for approval or not? I recall since no changes, no need to distribute>
5942	SNARF	HPLAS	Revision to SEMI E49.4-0298, <i>Guide for High Purity Solvent Distribution Systems in Semiconductor Manufacturing Equipment</i> , with title change to, <i>Guide for Ultrahigh Purity Solvent Distribution Systems with Metallic Fluid Paths in Semiconductor Manufacturing Equipment</i> SNARF revised to add the title change
5978	SNARF	HPLAS	Revision to SEMI E49.5-1104, <i>Guide for Ultrahigh Purity Solvent Distribution Systems in Semiconductor Manufacturing Equipment</i> , with title change to, <i>Guide for the Design of Ultrahigh Purity Solvent Distribution Systems with Non-Metallic Fluid Paths in Semiconductor Manufacturing Equipment</i> SNARF revised to add the title change

Table 6 Authorized Activities

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

#	Type	SC/TF/WG	Details
6258	SNARF	HPLAS	Revision to SEMI E49.7-0304, <i>Purity Guide for the Design and Manufacture of Ultrapure Water and Liquid Chemical Systems in Semiconductor Process Equipment</i> , with title change New SNARF, for 2 weeks review and GCS approval, target ballot in Cycle 6/7-17
6261	SNARF	CAM	Revision to SEMI C41-0705, <i>Specifications and Guidelines for 2-Propanol</i> including title change to <i>Specification and Guide for 2-Propanol</i> New SNARF, for 2 weeks review and GCS approval, target ballot in Cycle 7-17
6260	SNARF	CAM	Revision to SEMI C28-0611, <i>Specifications for Hydrofluoric Acid</i> , with title change to correct nonconforming title New SNARF, for 2 weeks review and GCS approval, target ballot in Cycle 7-17
6259	SNARF	CAM	Revision to SEMI C21-0708, <i>Specifications and Guidelines for Ammonium Hydroxide</i> , including title change to <i>Specification and Guide for Ammonium Hydroxide</i> New SNARF, for 2 weeks review and GCS approval, target ballot in Cycle 7-17
6262	SNARF	CAM	Revision to SEMI C44-0514, <i>Specification and Guide for Sulfuric Acid</i> New SNARF, for 2 weeks review and GCS approval, target ballot in Cycle 7-17
TBD	SNARF	CAM	Revision to SEMI C30-MMY, <i>Specification and Guide for Hydrogen Peroxide</i> New SNARF, for 2 weeks review and GCS approval. Ballot after SEMI publishes most recently adjudicated version of the document. Target new ballot in Cycle TBD-17
TBD	SNARF	CAM	Revision to SEMI C27-MMY, <i>Specification and Guide for Hydrochloric Acid</i> New SNARF, for 2 weeks review and GCS approval. Ballot after SEMI publishes most recently adjudicated version of the document. Target new ballot in Cycle TBD-17

#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

6256	Cycle 6/7-17	Precursor Specifications TF (Europe Chapter)	Reapproval of SEMI C81-0113, <i>Guide for Tris(Dimethylamino) Silane (3DMAS)</i>
6254	Cycle 6/7-17	CAM	Reapproval of SEMI C62-0309, <i>Specification for Porogen Precursors Used in Low K CVD Processes</i>
6255	Cycle 6/7-17	CAM	Reapproval of SEMI C63-1108, <i>Specification for Organosilicate Precursors Used in Low K CVD Processes</i>
6190	Cycle 6/7-17	CAM	Line-item Revision to SEMI C45-0309E, <i>Specification and Guideline for Tetraethylorthosilicate (TEOS)</i> , to correct nonconforming title
6250	Cycle 6/7-17	CAM	Line-item Revision to SEMI C29-1110, <i>Specifications and Guide for 4.9% Hydrofluoric Acid (10:1 v/v)</i> to correct nonconforming title
6253	Cycle 6/7-17	CAM	Reapproval of SEMI C40-1110, <i>Specification for Potassium Hydroxide, 45% Solution</i>
6252	Cycle 6/7-17	CAM	Reapproval of SEMI C1-0310, <i>Guide for the Analysis of Liquid Chemicals</i>
6257	Cycle 6/7-17	CAM	Reinstatement of SEMI F34-0998, <i>Guide for Liquid Chemical Pipe Labeling</i> <to distribute to GCS for approval or not? I recall since no changes, no need to distribute>
5942	Cycle 6/7-17	HPLAS	Revision to SEMI E49.4-0298, <i>Guide for High Purity Solvent Distribution Systems in</i>



			<i>Semiconductor Manufacturing Equipment</i> , with title change to, <i>Guide for Ultrahigh Purity Solvent Distribution Systems with Metallic Fluid Paths in Semiconductor Manufacturing Equipment</i> SNARF revised to add the title change
5978	Cycle 6/7-17	HPLAS	Revision to SEMI E49.5-1104, <i>Guide for Ultrahigh Purity Solvent Distribution Systems in Semiconductor Manufacturing Equipment</i> , with title change to, <i>Guide for the Design of Ultrahigh Purity Solvent Distribution Systems with Non-Metallic Fluid Paths in Semiconductor Manufacturing Equipment</i> SNARF revised to add the title change
6136	Cycle 7-17	UPW	Revision to SEMI F98-0305 (Reapproved 1111), <i>Guide for Treatment of Reuse Water in Semiconductor Processing</i>

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

#	TF	Title	Expiration Date
5809	CAM	Line item revision to SEMI C69-0611, <i>Test Method for the Determination of Surface Areas of Polymer Pellets</i>	10/07/2018

Table 9 SNARF(s) Abolished

#	TF	Title
NONE		

Table 10 Standard(s) to receive Inactive Status

Standard Designation	Title
NONE	

Table 11 New Action Items

Item #	Assigned to	Details
01July 2017	co-Chairs and TF leaders, Inna S.	Prepare the proposal to update current Charter and Scope to include Facilities volume documents related to critical chemicals processes. Inna to provide the procedure for Scope/Charter updates according to SEMI Regulations.
02July 2017	Bob McIntosh	Review SNARF 5809 for Line item revision to SEMI C69-0611, <i>Test Method for the Determination of Surface Areas of Polymer Pellets</i> . Evaluate if changes specified in the SNARF were already implemented and revised document is published.
03July 2017	Bob McIntosh, Inna S.	To verify whether SNARF #5809 should stay open or changes were already addressed with latest published version of SEMI C69.
04July 2017	Don Hadder, Inna S.	Prepare SNARFs for Revision to SEMI C41, C28, C21, C30, C27, C44, C1, and distribute for 2-week member review and GCS approval
05July 2017	Inna S.	Prepare ballots for Cycle6-7 for Reapproval of SEMI C62, C63 and Line-item ballot for SEMI C28 to correct nonconforming title.
06July 2017	Inna S.	Arrange SEMIViews access for: Frank Flowers for SEMI C20 and C34; for Bob McIntosh for SEMI C78, F18, F8
07July 2017	Inna S.	Arrange SEMIViews access for Process Chemicals Volume for Lisa Mei-Ami

Table 12 Previous Meeting Action Items

<i>Item #</i>	<i>Assigned to</i>	<i>Details</i>
2016 Fall #7	Inna S (SEMI), Lisa Mey-Ami	Inna to help Lisa with SEMI process, including preparation of SNARFs for revision to SEMI C61 and SEMI C63. Arrange access to C1 as referred documents. Access to C1 arranged. Lisa will have SNARFs for revision to C61 and C63 at SEMICON West for TC approval.
2016Apr#3	James Amano Inna	Follow up on listings of all the documents and origination committees for Facilities & Gases. Inna created the spreadsheet and circulated within TCs (LChem, Gases, and Facilities) by SW. Ongoing project – feedback from LCh received. Pending feedback from G&F TC co-Chairs.
2016Apr#4	James Amano	Follow up – if a committee is identified as a recipient of an inter-committee at the SNARF level, staff to provide a report at the next committee meeting.
2017 Spring #01	Bob McIntosh, Inna S. & Naoko T.(SEMI)	Verify with Ultrapure Liquid Evaluation Study Group what kind of help is needed. N.A. Liquid Chemicals Chapter may have resources and expertise to support this Study Group. Offer to help is communicated and will be discussed at Japan TC meeting Dec. 13, 2017. No response/feedback/help needed yet.
2017 Spring #02	Steve R., Inna S.	Steve to make recommendation on SEMI C41. Inna (SEMI) support the SNARF. DONE
2017 Spring #03	Inna S.	Arrange access to SEMI C1 for: Bob McIntosh – doc version for editing; Kirsten – SEMIViews Read-only for review. DONE

1. Welcome, Reminders, and Introductions

Don Hadder (Intel) called the meeting to order at 14:01PM. The meeting reminders on antitrust issues, intellectual property issues and holding meetings with international attendance were reviewed. Attendees introduced themselves.

Attachment 01: SEMI Standards Required Meeting Elements.ppt

2. Review of Previous Meeting Minutes

2.1 The TC Chapter reviewed and approved the minutes of the previous NA Spring 2017 Standards meeting.

Motion: To approve minutes as written

By / 2nd: Koh Murai (MegaFluids) / Chuck Dale (GE)

Discussion: None

Vote: 13Y/0. Motion passed.

Attachment 02: NA Liquid Chemicals TC Meeting Minutes (April 2017).pdf

3. SEMI Staff Report

Inna Skvortsova (SEMI) gave the SEMI Staff Report. Of note:

SEMI Global 2017 Calendar of Events

- SEMICON West (July 11-13, 2017, San Francisco, California)
- SEMICON Taiwan (September 13-15, 2017, Taipei, Taiwan)
- PV Taiwan (September 18-20, 2017, Taipei, Taiwan)
- SEMICON Europa (November 14-17, 2017, Munich, Germany)
- SEMICON Japan (December 13-15, 2017, Big Sight Tokyo, Japan)



Upcoming North America Meetings 2017

- NA Standards Fall 2017 Meetings (November 6-9, 2017, SEMI HQ, Milpitas, California)
- NA Standards Spring 2017 Meeting (April 2-5, 2018 <tentative dates> SEMI HQ, Milpitas, California)
- SEMICON West 2018 Meetings (July 10-12, 2018 San Francisco, California)

Letter Ballot Critical Dates for NA Standards Spring 2017 meetings

- Cycle 6-17: due Jul 21 / Voting Period: Aug 1 – Aug 31
- Cycle 7-17: due Aug 18 / Voting Period: Sep 1 – Oct 2
- Cycle 8-17: due Oct 13 / Voting Period: Oct 27 – Nov 27
- Cycle 9-17: due Nov 16 / Voting Period: Nov 29 – Dec 29

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

• *SEMI Standards Publications*

Cycle	New	Revised	Reapproved	Withdrawn
March 2017	0	16	11	0
April 2017	0	6	0	0
May 2017	0	4	6	0
June 2017	2	4	0	0

Total SEMI Standards in portfolio: 974. Includes 191 Inactive Standards

• *GTC Charter & Scope Review*

- Problem Statement
 - Majority of GTCs do not have unified scope
 - Most have charter but not scope
 - Only a few GTC include scope in its charter
- As any task force that is parented by a TC Chapter(s) of the GTC are required to be within the charter and scope of its parent GTC (See Regulations ¶5.7.3.2), every GTC must have a set of published charter and scope.
- Current charter & scope of GTC
 - <http://downloads.semi.org/web/wstdsbal.nsf/StdCharters>
- Liquid Chemicals Global TC
- *Current Charter*

To identify and develop international standards fulfilling the technical needs of the industry for liquid chemicals and liquid chemical distribution.
 Liquid Chemicals Committee standardization includes:



1. analytical methods for evaluating liquid chemicals and materials used to contain and transport them,
 2. specifications for liquid chemicals, and the materials used to transport them,
 3. contamination related issues and analytical methods,
 4. performance specifications for liquid chemical distribution systems and components,
 5. physical interface specifications for sub-systems and components, and
 6. guides for definition, use, handling and installation.
- *Current Scope*
 - Part of the Charter.
 - *No action needed from the TC.*
- Requirements/Process Reminders for TC Chapter Meetings
 - Standards Document Development Project Period
 - Project period shall not exceed 3 years (Regs 8.3.2)
 - SNARF approval to TC Chapter approval
 - If document development activity is found to be continuing, but cannot be completed within the project period, TC Chapter may grant one-year extension at a time, as many times as necessary.
 - The TC Chapter should review the expiration dates for all applicable SNARFs at each TC Chapter meeting. (PM Note 10)
 - SNARF Review Period
 - A submitted SNARF for a new, or for a major revision to an existing, Standard or Safety Guideline is made available to all members of a TC Chapter's parent global technical committee for two weeks for their review and comment. (Regs 8.2.1)
 - If the SNARF is submitted at a TC Chapter meeting, the committee can review and approve, but the SNARF will need to be distributed for two weeks and then approved via GCS.
 - Procedures for Correcting Nonconforming Titles of Published Standards Document (PM Appx. 4)
 - Some Standards qualify for a special procedure where a line item change can be used to correct the titles. Otherwise, the corrective action will likely require a major revision.
 - Use of PIP form is allowed to correct title if all of the following conditions are met:
 - Standards having only one Subtype
 - Changes either Specifications to Specification or Test Methods to Test Method
 - No concomitant text change is required
 - Approved by at least one co-chair of the TC Chapter
 - Example:
 - SEMI F69-1213, Test Methods for Transport and Shock Testing of Gas Delivery Systems
- *SNARF(s) and TFOF Approved by GCS in between TC Chapter Meetings*
 - SNARF for **Revision to SEMI F104-0312** Particle Test Method for Evaluation of Components Used in Ultrapure Water and Liquid Chemical Distribution Systems, with title change to correct nonconforming title.
 - Approved by GCS 05/09/2017
 - SNARF# 6195

SNARF 3 year status TC Chapter may grant a one-year extension:

- SNARF 5831, Revision to SEMI C27-0708, *Specifications and Guideline for Hydrochloric Acid with title change to: Specification and Guide for Hydrochloric Acid*
 - Balloted in Cycle 5-17 (no rejects)
- SNARF 5809, Line item revision to SEMI C69-0611, *Test Method for the Determination of Surface Areas of Polymer Pellets*

Nonconforming Titles

- SEMI C64-0308 (Reapproved 1214), *SEMI Statistical Guidelines for Ship To Control*
- SEMI E49.7-0304, *Purity Guide for the Design and Manufacture of Ultrapure Water and Liquid Chemical Systems in Semiconductor Process*
- SEMI F104-0312, *Particle Test Method Guide for Evaluation of Components Used in Ultrapure Water and Liquid Chemical Distribution Systems*

NOTE: Refer to Procedure Manual (PM) Appendix Table A4-1 and A4-2

- Documents due for 5 Year Review

Name	Due for Review	Title
SEMI C41-0705	7/1/2010	Specifications and Guidelines for 2-Propanol
SEMI F98-0305 (Reapproved 1111)	11/1/2016	Guide for Treatment of Reuse Water in Semiconductor Processing
**SEMI C45-0309E	3/1/2014	Specification and Guideline for Tetraethylorthosilicate (TEOS)
SEMI C63-1108	11/1/2013	Specification for Organosilicate Precursors Used in Low K CVD Processes
SEMI C1-0310	3/1/2015	Guide for the Analysis of Liquid Chemicals
**SEMI C29-1110	11/1/2015	Specifications and Guide for 4.9% Hydrofluoric Acid (10:1 v/v)
SEMI C62-0309	3/1/2014	Specification for Progen Precursors Used in Low K CVD Processes
SEMI C40-1110	11/1/2015	Specification for Potassium Hydroxide, 45% Solution
**SEMI F104-0312	3/1/2017	Particle Test Method Guide for Evaluation of Components Used in Ultrapure Water and Liquid Chemical Distribution Systems
SEMI F40-0699E	TBD	Practice for Preparing Liquid Chemical Distribution Components for Chemical Testing
SEMI C78-0113	1/25/2018	Test Method for Determining Roughness of Polymer Surfaces Used in Ultrapure Water and Liquid Chemical Distribution Systems by Atomic Force Microscopy
SEMI C34-0113	1/25/2018	Specification and Guide for Mixed Acid Etchants
SEMI C79-0113	1/31/2018	Guide to Evaluate the Efficacy of Sub-15 nm Filters Used in Ultrapure Water (UPW) Distribution Systems
SEMI C20-0213	2/19/2018	Specification and Guide for Ammonium Fluoride 40%
SEMI F18-95 (Reapproved 0413)	04/26/2018	Guide for Determining the Hydrostatic Strength of, and Design Basis for, Thermoplastic Pipe and Tubing
SEMI F8-0998 (Reapproved 0613)	06/30/2018	Test Method for Evaluating the Sealing Capabilities of Tube Fitting Connections Made of Fluorocarbon Materials, When Subjected to Tensile Forces

Intercommittee Ballots (From Liq Chem TC to Facilities TC)

- Doc #5943 – Revision to SEMI E49.4-0298, *Guide for High Purity Solvent Distribution Systems in Semiconductor Manufacturing Equipment*
 - Intercommittee to Facilities TC
 - Plan ballot in Cycle 6/7-17
- Doc #5978 – Revision to SEMI E49.5-1104, *Guide for Ultrahigh Purity Solvent Distribution Systems in Semiconductor Manufacturing Equipment*
 - Plan ballot in Cycle 6/7-17



- Intercommittee to Facilities TC
- Doc #6136 – Revision to SEMI F98-0305 (Reapproved 1111), Guide for Treatment of Reuse Water in Semiconductor Processing
 - Plan to ballot in Cycle 6/7-17
 - Intercommittee to Facilities TC

Attachment 03: SEMI Staff Report Liquid Chemicals TC (July 2017).ppt

Action Item: (co-Chairs and TF leaders, Inna) Prepare the proposal to update current Charter and Scope to include Facilities volume documents related to critical chemicals processes. Inna to provide the procedure for Scope/Charter updates according to SEMI Regulations.

Action Item: (Bob McIntosh) To review SNARF #5809 and evaluate if work has been completed or assigned ownership and action plan.

4. Liaison Reports

4.1 Liquid Chemicals Europe TC Chapter

James Amano (SEMI) reported for the Liquid Chemicals Europe (EU) TC Chapter.

- Leadership
 - Committee Co-Chairs: Jean-Marie Collard (Solvay Chemicals) ; Gordon Ferrier (Gordon F Consulting)
- Meeting Information
 - Last Meeting: October 26, 2016 at SEMICON Europa, Grenoble, France
 - Next Meeting (tentative): November 2017 at SEMICON Europa Munich, Germany

Gasses and Liquid Chemicals Activities

- *The below ballots passed adjudication at SEMICON Europa:*
 - 5656B, Revision to SEMI C65-0308 : Guide for Trimethylsilane (3MS)
 - 5657B, Revision to SEMI C66-0308: Guide for Trimethylaluminium (TMAI)
 - 6077, Reapproval for SEMI C67-0811 : Guide for Hafnium Amides
 - 6078, Reapproval for SEMI C68-0811 : Guide for Zirconium Amides
 - 6079, Reapproval for SEMI C73-0811 : Guide for Hafnium Chloride
 - 6080, Reapproval for SEMI C74-0811: Guide for Hafnium Tert-Butoxide
 - 6081, Reapproval for SEMI C75-0811: Guide for Tetrakis (Dimethylamino) Titanium
 - 6082, Reapproval for SEMI C76-0811 : Guide for Zirconium Tert-Butoxide
 - 6083, Reapproval for SEMI C72-0811: Guide for Propylene-Glycol-Mono-Methyl-Ether (PGME), Propylene-Glycol-Mono-Methyl-Ether-Acetate (PGMEA) and the Mixture 70wt% PGME / 30wt%
- *Request NA Liquid Chemicals TC Chapter, at their SEMICON West 2017 meeting, to:*
 - Approve SNARF for Reapproval of SEMI C81-0113 Guide for Tris(Dimethylamino) Silane (3DMAS)
 - Authorize issuance of ballot in Cycle 6 or 7 for adjudication at SEMICON Europa in November 2017 for Reapproval of SEMI C81-0113 Guide for Tris(Dimethylamino) Silane (3DMAS)
- *Presentation at SEMICON Europa meetings:*
 - IRDS versus ITRS and the Latest about Surface Contamination Issues.
 - Jochen Ruth (Pall) and Andreas Neuber (AMAT)
- Staff Contact: James Amano (jamano@semi.org)

Attachment 04: Europe Gases & Liquid Chem Report (July 2017).pdf



Motion: To approve SNARF for Reapproval of SEMI C81-0113 Guide for Tris(Dimethylamino) Silane (3DMAS)
By / 2nd: Chuck Dale (GE) / Slava Libman (FTD Solutions)
Discussion: None
Vote: 14Y/0. Motion passed.

4.2 Liquid Chemicals Japan TC Chapter

James Amano (SEMI) reported for the Liquid Chemicals Japan TC Chapter. Of note:

- Committee Co-chairs
 - Hiroshi Tomita (Toshiba)
 - Hiroyuki Araki (SCREEN Semiconductor Solutions)
- Last Meeting: April 21, 2017 during Japan Spring Meetings 2017 at SEMI Japan, Tokyo, Japan
- Next Meeting: December 13, 2017 during SEMICON Japan Meeting 2017 at Tokyo Big Sight, Tokyo, Japan
- Ballots results – NONE
- Upcoming Ballots:
 - #6197 : Reapproval to SEMI F110-0712
 - Ballot submitted for Cycle 5-2017, and to be reviewed at Liquid Chemical Japan TC Chapter on December 13, 2017 during SEMICON Japan 2017
 - #6196 : Reapproval to SEMI C77-0912
 - Ballot will be submitted for Cycle 7-2017, and to be reviewed at Liquid Chemical Japan TC Chapter on December 13, 2017 during SEMICON Japan 2017
- New SNARFs/TFOFs
 - #6197 : Reapproval to SEMI F110-0712
 - #6196 : Reapproval to SEMI C77-0912
- Task Force / Study Group Reports:
 - Diaphragm Valve Task Force
 - No activities
 - Welding Fitting Task Force
 - No activities
 - Liquid Filter Task Force
 - #6197 - Reapproval to SEMI F110-0712
 - SNARF was approved at Liquid Chemical Japan TC Chapter meeting on April 21, 2017
 - Ballot submitted for Cycle 5-2017, and to be reviewed at Liquid Chemical Japan TC Chapter on December 13, 2017 during SEMICON Japan 2017.
 - Liquid-Borne Particle Counter (LPC) Task Force
 - 6196 - Reapproval to SEMI C77-0912
 - SNARF was approved at Liquid Chemical Japan TC Chapter meeting on April 21, 2017
 - Ballot will be submitted for Cycle 7-2017, and to be reviewed at Liquid Chemical Japan TC Chapter on December 13, 2017 during SEMICON Japan 2017
 - Ultrapure Liquid Evaluation Study Group
 - Considering to standardize the particle measurement at POP in future.
 - Asking a cooperation by Interfacial Nano Electrochemistry for seeking the solution to the issues concerned to analyzing metals of organic solvent including IPA.

For more information, please contact: Mizue Iwamura, SEMI Japan, miwamura@semi.org

Attachment 05: Japan Liquid Chem Report (July 2017).pdf



5. 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.

Ballot #5642A

The TC Chapter reviewed the Document #5642, Revision to SEMI C35-0708, *Specifications and Guideline for Nitric Acid with title change to: Specification and Guide for Nitric Acid*

The ballot **passed** TC review and will be submitted to the ISC A&R for procedural review. Details can be found in the attached Procedural Review file.

Motion: Document # 5642A is not a Safety Document, when all safety-related information is removed, Document is still technically sound and complete.

By / 2nd: Don Hadder (Intel) / Bob McIntosh (GF Piping)

Discussion: None.

Vote: 14-0. Motion passed.

Motion: Forward Document # 5642A to the ISC A&R for procedural review as written.

By / 2nd: Don Hadder (Intel) / Bob McIntosh (GF Piping)

Discussion: None.

Vote: 14-0. Motion passed.

Attachment 06: 5642A_Procedural Review

Ballot #5831B

The TC Chapter reviewed the Document #5831B, Revision to SEMI C27-0708, *Specifications and Guidelines for Hydrochloric Acid*

The ballot **passed** TC review and will be submitted to the ISC A&R for procedural review. Details can be found in the attached Procedural Review file.

Motion: Document # 5831B is not a Safety Document, when all safety-related information is removed, Document is still technically sound and complete.

By / 2nd: Don Hadder (Intel) / Bob McIntosh (GF Piping)

Discussion: None.

Vote: 14-0. Motion passed.

Motion: Forward Document # 5831B to the ISC A&R for procedural review as written.

By / 2nd: Don Hadder (Intel) / Bob McIntosh (GF Piping)

Discussion: None.

Vote: 14-0. Motion passed.

Attachment 07: 5831B_Procedural Review



Ballot #6173

The TC Chapter reviewed the Document #6173, Line-item Revision to SEMI C30-1110, *Specifications for Hydrogen Peroxide*, to correct nonconforming title

The ballot **passed** TC review and will be submitted to the ISC A&R for procedural review. Details can be found in the attached Procedural Review file.

Motion: Document # 6173 is not a Safety Document, when all safety-related information is removed, Document is still technically sound and complete.

By / 2nd: Don Hadder (Intel) / Bob McIntosh (GF Piping)

Discussion: None.

Vote: 14-0. Motion passed.

Motion: Forward Document # 6173 to the ISC A&R for procedural review as written.

By / 2nd: Don Hadder (Intel) / Bob McIntosh (GF Piping)

Discussion: None.

Vote: 14-0. Motion passed.

Attachment 08: 6173_Procedural Review

6. Subcommittee and Task Force Reports

6.1 High Purity Liquid Assemblies and Systems (HPLA&S) Task Force

Koh Murai reported for the HPLA&S and CAM Task Forces. Of note:

- Leadership change - new Task Force co-leader: David Kandiyeli

Motion: To approve David Kandiyeli (Mega Fluid Systems) as a co-leader of HPLA&S TF and CAM TF of NA Liquid Chemicals TC.

By / 2nd: Koh Murai (Mega Fluid Systems) / Slava Libman (FTD Solutions)

Discussion: None.

Vote: 14-0. Motion passed

- E49.2 – Guide for the Qualification of Polymer Assemblies Used for Liquid Chemical Systems in Semiconductor Equipment
 - Approved and published.
- E49.7 – Guide for the Design and Manufacture of Polymer Assemblies Used for Liquid Chemical System in Semiconductor Equipment
 - Completed review and revision.
 - Need to submit SNARF for GCS review
 - Submitting for ballot Cycle 7-17
- E49.4 – Guide for Ultrahigh Purity Solvent Distribution Systems with Metallic Fluid Paths in Semiconductor Manufacturing Equipment
 - SNARF revision to update title
 - Submitting for ballot Cycle 7-17
- E49.5 - Guide for Ultrahigh Purity Solvent Distribution Systems with Non-Metallic Fluid Paths in Semiconductor Manufacturing Equipment



- SNARF revision to update title
- Submitting for ballot Cycle 7-17

Motion: Approve SNARF for Reinstatement of SEMI F34-0998, Guide for Liquid Chemical Pipe Labeling
By / 2nd: Koh Murai (Mega Fluid Systems) / Bob MacIntosh (GF Piping)
Discussion: None.
Vote: 15-0. Motion passed

Motion: Approve revised SNARF for Revision to SEMI E49.4-0298, Guide for High Purity Solvent Distribution Systems in Semiconductor Manufacturing Equipment, with title change.
By / 2nd: Koh Murai (Mega Fluid Systems) / Slava Libman (FTD Solutions)
Discussion: None.
Vote: 15-0. Motion passed

Motion: Approve revised SNARF for Revision to SEMI E49.5-1104, Guide for Ultrahigh Purity Solvent Distribution Systems in Semiconductor Manufacturing Equipment, with title change to
By / 2nd: Chuck Dale (GE) / Koh Murai (Mega Fluid Systems)
Discussion: None.
Vote: 15-0. Motion passed

Attachment 09: HPLA&S Task Force Report (July 2017).pdf

6.2 Ultra Pure Water (UPW) Task Force Report

Slava Libman reported for the UPW Task Force. Of note:

- F61 and F75 – Approved and published in June 2017
 - Complete rewrite of the previous F61 version and major revision of F75
 - Including UPW distribution and tool hook-up
 - System Definitions - Basis of Design - Material of construction - Material handling - Joining - Labeling - QA/QC – Documentation - Redundancy
 - Distribution Concept
 - UPW metrology
 - Operations – Maintenance – Troubleshooting
 - Linked with other SEMI documents
 - Filter performance (C79); IX resin performance (C93); Tool UPW system (E49); High Purity Polymer (F57); UPW Quality Guide (F63)
- SEMI C93 – Polish IX resin
 - Published with a change from preliminary to full consensus in February 2017
- UPW Quality SEMI F63



- Approved and published June 2017
- Next revision expected in 2018
- SEMI E49.2 and E49.7 – high purity polymer tool assembly
 - Updated and approved, aligned with SEMI F61
- Revision to SEMI F98, Guide for Treatment of Reuse Water in Semiconductor Processing
 - 6 months development
 - Complete rewrite from definitions document to more comprehensive guide
 - Currently in final phase of editorial review
 - Scheduled for ballot Cycle 7-17

Attachment 10: UPW Task Force Report (July 2017).pdf

6.3 High Purity Polymer Materials & Components (HPPM&C) Task Force Report

Bob McIntosh reported for HPPM&C Task Force. Of note:

- No changes in scope and direction
- Progress done:
 - We determined that we will need to include updating SEMI F104 for particle measurement of components. It is a Test Method.
 - The group has regular bi-weekly meetings and has a core group of 18 that regularly attend.
 - We have convened two tests to support making changes to standards for PVDF pipe and PFA Tubing. PVDF complete. PFA to start in July (delayed due to communication issues)
 - F104, Test Method for Particle Measurement of Components, revision TF kicked off and meeting regularly.
 - F104 has a proposed test scheme.
 - We have started the process for selecting which components will be included in the F104 testing.
 - We have made changes to the existing tables already to adjust the scope of components covered.
 - We are still on track to have document ready for November face-to-face meeting

Action Item: (Bob McIntosh) Review SNARF 5809 for Line item revision to SEMI C69-0611, *Test Method for the Determination of Surface Areas of Polymer Pellets*. Evaluate if changes specified in the SNARF were already implemented and revised document is published.

Attachment 11: HPPM&C Task Force Report (July 2017).pdf

6.4 Chemical Analytical Methods Task Force Report

- Draft Doc. #5991, New Standard: *Test Method for Determining Density of Chemical Mechanical Polish (CMP) Slurries*
 - Currently under development (15% complete)
 - Agreement on fundamentals
 - Significant digits



- Temperature compensation
- Dispersion of sample
- Diverse participation
- Expected to be ready for ballot October or November 2017

Action Items:

(Don Hadder, Inna Skvortsova) Prepare SNARFs for Revision to SEMI C41, C28, C21, C30, C27, C44, C1, and distribute for 2-week member review and GCS approval

(Inna Skvortsova) Prepare ballots for Cycle6-7 for Reapproval of SEMI C62, C63 and Line-item ballot for SEMI C28 to correct nonconforming title.

(Inna Skvortsova) Arrange SEMIViews access for: Frank Flowers for SEMI C20 and C34; for Bob McIntosh for SEMI C78, F18, F8

Attachment 12: CAM Task Force Report (July 2017).pdf

7. Old Business

7.1 Standards due for Five-Year Review.

Inna Skvortsova addressed the TC Chapter on this topic. Of note:

Name	*Due	Title	Status / Action required
**SEMI C41-0705	7/1/2010	<i>Specifications and Guidelines for 2-Propanol</i>	SEMI Staff to prepare Reapproval ballot for Cycle 7-17
SEMI C63-1108	11/1/2013	<i>Specification for Organosilicate Precursors Used in Low K CVD Processes</i>	SEMI Staff to prepare Reapproval ballot for Cycle 7-17
**SEMI C45-0309E	3/1/2014	<i>Specification and Guideline for Tetraethylorthosilicate (TEOS)</i>	SEMI Staff to prepare Reapproval ballot for Cycle 7-17
SEMI C62-0309	3/1/2014	<i>Specification for Progen Precursors Used in Low K CVD Processes</i>	SEMI Staff to prepare Reapproval ballot for Cycle 7-17
SEMI C1-0310	3/1/2015	<i>Guide for the Analysis of Liquid Chemicals</i>	Don H and Frank F to review and prepare for ballot
**SEMI C29-1110	11/1/2015	<i>Specifications and Guide for 4.9% Hydrofluoric Acid (10:1 v/v)</i>	SEMI Staff to prepare Reapproval ballot for Cycle 7-17
SEMI C40-1110	11/1/2015	<i>Specification for Potassium Hydroxide, 45% Solution</i>	SEMI Staff to prepare Reapproval ballot for Cycle 7-17
SEMI F98-0305 (Reapproved 1111)	11/1/2016	<i>Guide for Treatment of Reuse Water in Semiconductor Processing</i>	Slava L. working on ballot preparation
**SEMI F104-0312	3/1/2017	<i>Particle Test Method Guide for Evaluation of Components Used in Ultrapure Water and Liquid Chemical Distribution Systems</i>	Bob McIntosh is working on ballot for end of 2017.
SEMI F40-0699E	TBD	<i>Practice for Preparing Liquid Chemical Distribution Components for Chemical Testing</i>	Bob M. will review and make decision on level of revision to proceed (& distribute prior to Fall to GTC members for review)
SEMI C78-0113	1/1/2018	<i>Test Method for Determining Roughness of Polymer Surfaces Used in Ultrapure Water and Liquid</i>	Bob M. will review and make decision on level of revision to



		<i>Chemical Distribution Systems by Atomic Force Microscopy</i>	proceed (& distribute prior to Fall to GTC members for review)
SEMI C34-0113	1/1/2018	<i>Specification and Guide for Mixed Acid Etchants</i>	CAM TF, Don and Frank to review for decision by Nov
SEMI C79-0113	1/1/2018	<i>Guide to Evaluate the Efficacy of Sub-15 nm Filters Used in Ultrapure Water (UPW) Distribution Systems</i>	Slava L. to review prior to Fall for decision on SNARF
SEMI C20-0213	2/1/2018	<i>Specification and Guide for Ammonium Fluoride 40%</i>	TBD after Fall 2017 meetings
SEMI F18-95 (Reapproved 0413)	4/26/2018	<i>Guide for Determining the Hydrostatic Strength of, and Design Basis for, Thermoplastic Pipe and Tubing</i>	TBD after Fall 2017 meetings
SEMI F8-0998 (Reapproved 0613)	6/30/2018	<i>Test Method for Evaluating the Sealing Capabilities of Tube Fitting Connections Made of Fluorocarbon Materials, When Subjected to Tensile Forces</i>	Bob M. reviewed. All to review by Fall meetings for decision.

7.2 SNARFs Approaching 3-Year Review

No SNARFs need extension.

Action Item(s):

(Bob McIntosh, Inna) To verify whether SNARF #5809 should stay open or changes were already addressed with latest published version of SEMI C69.

8. New Business

8.1 New TFOFs and SNARFs Authorization:

- No new TFOFs
- Technical Committee reviewed and authorized new and revision to existing SNARFs as part of respective Task Force Reports/sections for the following documents:
 - Reapproval of SEMI C81, C62, C63, C40, C1,
 - Line –item revision to SEMI C45, C29
 - Revision to SEMI C49.4, 49.5
 - Reinstatement of SEMI F34
- Technical Committee authorized to distribute new SNARFs for the following documents to for 2-week Global TC membership review followed by GCS approval:
 - Revision to SEMI C41, C28, C21, C44, C30, C27

8.2 New Ballots Authorization:

- Ballot # TBD for Reapproval of SEMI C81 by Precursor Specifications TF (EU) is approved for Cycle 7-2017 submission.
- Ballot #TBD for Reapproval of SEMI C62, by CAM TF is approved for Cycle 7-2017 submission.
- Ballot #TBD for Reapproval of SEMI C63, by CAM TF is approved for Cycle 7-2017 submission.
- Ballot #TBD for Reapproval of SEMI C40, by CAM TF is approved for Cycle 7-2017 submission.
- Ballot #TBD for Reapproval of SEMI C1, by CAM TF is approved for Cycle 7-2017 submission.



- Ballot #TBD for Reinstatement of SEMI F34, by CAM TF is approved for Cycle 7-2017 submission.
- Ballot #TBD for Line-item revision to SEMI C45, by CAM TF is approved for Cycle 7-2017 submission.
- Ballot #TBD for Line-item revision to SEMI C29, by CAM TF is approved for Cycle 7-2017 submission.
- Ballot #TBD for Revision to SEMI C49.4, by HPLAS TF is approved for Cycle 7-2017 submission.
- Ballot #TBD for Revision to SEMI C49.5, by HPLAS TF is approved for Cycle 7-2017 submission.
- Ballot #TBD for Revision to SEMI F98, by UPW TF is approved for Cycle 7-2017 submission.

Motion: Authorize issuance of ballot in Cycle 6 or 7 for Reapproval of SEMI C81-0113 Guide for Tris(Dimethylamino) Silane (3DMAS)
By / 2nd: Chuck Dale (GE) / Slava Libman (FTD Solutions)
Discussion: None
Vote: 14Y/0. Motion passed.

Motion: Authorize issuance of ballot in Cycle 6 or 7 2017 for Reinstatement of SEMI F34-0998, *Guide for Liquid Chemical Pipe Labeling*
By / 2nd: Chuck Dale (GE) / David Kandiyeli (Mega Fluid Systems)
Discussion: None.
Vote: 15-0. Motion passed

Motion: Authorize issuance of ballot in Cycle 6 or 7 2017 for Revision to SEMI F98-0305, Guide for Treatment of Reuse Water in Semiconductor Processing
By / 2nd: Slava Libman (FTD Solutions) / Bob McIntosh (GF Piping)
Discussion: None.
Vote: 15-0. Motion passed

Motion: Authorize issuance of ballots for Reapproval of SEMI C62, C63, C40, C1 in Cycle 6 or 7 2017
By / 2nd: Don Hadder (Intel) / Koh Murai (Mega Fluids Systems)
Discussion: None.
Vote: 15-0. Motion passed

Motion: Authorize issuance of ballots for Line-item revision to SEMI C45, C29 in Cycle 6 or 7 2017
By / 2nd: Don Hadder (Intel) / Koh Murai (Mega Fluids Systems)
Discussion: None.
Vote: 15-0. Motion passed

Motion: Authorize issuance of ballots for Revision ballots for SEMI C49.4, C49.5 in Cycle 6 or 7 2017
By / 2nd: Don Hadder (Intel) / Koh Murai (Mega Fluids Systems)
Discussion: None.
Vote: 15-0. Motion passed



8.3 SCIS Liquid Delivery Group Report

Bob McIntosh presented SCIS Liquid Delivery Group Report. Of note:

- SEMI F57/104 REVISION TF UPDATE
- Objective – align SEMI F57 Specification with new SEMI F63 (11 16) UPW spec.
 - Only Calcium showed a potential issue.
 - PFA tubing test start in July
- SEMI F104 Revision TF is officially approved with goal to both update list of components to be included in particle testing and to update the particle spec for both size and measurement.
 - State of the art optical particle counters are not capable of measuring the critical particle size.
 - Lowest detection limit available 20-30nm.
 - Low detection particle efficiency (< 5%) at these sizes.
 - Detection efficiency vary between manufactures and instruments.
 - New technologies such as nebulization and aerosol sizing (scanning TPC and LNS) however correlation to historical OPC data is not well understood.
 - One deliverable of testing is to gain 1st time data on OPC's and new tech counters for a number of components.
 - What ever filters are selected for organic extractables will be included in the F104 particle testing.
- As related SEMI Standards activities progress, the group is now focusing on organic extractables.
- Problem Statement
 - Evidence from end-users has linked organic contamination to wafer quality – affects yield, increases costs (@ advanced process nodes, sub-10nm & beyond)
 - To date, no standards exist for measuring organic contamination from critical components in relevant solvents
 - There is a need for such a new standard or amendment to existing standards
- Benefits
 - By establishing this test method, we would be able to determine relative organic levels from critical components—most preferably on a bulk and specific basis
 - For filter suppliers, liquid delivery, and other (sub)component suppliers, this is an opportunity to *differentiate* products according to an agreed-upon rationale
 - OEMs benefit from being able to provide organics-related specifications based on results for components
 - End-users will be able to make selections based on data collected on a consistent basis with respect to organics
- Help Needed
 - Participants for experiment
 - Pall and Entegris currently willing to participate as filter suppliers for organics study—soliciting additional filter manufacturers
 - Raw materials suppliers—as sources of information on potential extractables
 - Prospective third-party testing organizations: contract laboratories, research organizations
 - Funding: currently expected to be \$15k for conduction of testing—samples to be provided by supplier participants
 - Content experts: primarily seek guidance from IDMs

Attachment 13: SCIS Liquid Delivery Group Report July 2017.pdf



8.4 SECC (former WECC) and IRDS Council Reports

Slava Libman presented summary and goals for upcoming IRDS SECC Workshop. For details and additional information about IRDS Council, please contact Slava Libman at slibman@fidsolutions.net

9. Next Meeting and Adjournment

The next meeting is scheduled for November 7, 2017 at SEMI HQ, Milpitas CA in conjunction with Fall 2017 NA Standards Meetings. See <http://www.semi.org/standards-events> for the current list of events.

Having no further business, a motion was made to adjourn. Adjournment was at 16:33 PM.

Respectfully submitted by:

Inna Skvortsova

Sr. Standards Coordinator

SEMI North America

Phone: 408-9436996

Email: iskvortsova@semi.org

Minutes tentatively approved by:

Frank Flowers (Peroxy Chem), Co-chair	09/23/2017
Don Hadder (Intel), Co-chair	09/21/2017

Table 13 Index of Available Attachments^{#1}

<i>Title</i>	<i>Title</i>
Attachment 01: SEMI Standards Required Elements.ppt	Attachment 08: 6173_Procedural Review
Attachment 02: NA Liquid Chemicals TC Meeting Minutes (April 2016).pdf	Attachment 09: HPLA&S Task Force Report (July 2017)
Attachment 03: SEMI Standards Staff Report (July 2017).ppt	Attachment 10: UPW Task Force Report (July 2017)
Attachment 04: Europe Gases & Liquid Chem Liaison Report (July 2017).pdf	Attachment 11: HPPM&C Task Force Report (July 2017)
Attachment 05: Japan Liquid Chem Liaison Report (July 2017).pdf	Attachment 12: CAM Task Force Report (July 2017)
Attachment 06: 5642A_Procedural Review	Attachment 13: SCIS Liquid Delivery Group Report (July 2017)
Attachment 07: 5831B_Procedural Review	

#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 [SEMI Staff Name] at the contact information above.