Record of Line-item Letter Ballot Review by TC Chapter for Procedural Review

Region/Locale: Japan
Global Technical Committee: Silicon Wafer
TC Chapter Cochairs: Naoyuki Kawai/Meiji University, Tesuya Nakai/SUMCO
Standards Staff: Junko Collins

	Scheduled in Background Statement	Actual
Date	12/14/2017	12/14/2017
Location	Tokyo Big Sight, Tokyo Japan	Tokyo Big Sight, Tokyo Japan
Reason for Change of Date and/or Location (if changed)		

Note: See *Regulations* ¶ 9.5 Exception for allowable reason to change.

Document Information

I. Document Number, Title, Lists of Line Items

Document Number	Document Title
6170	Line Item Revision to SEMI M49-1016 GUIDE FOR SPECIFYING GEOMETRY MEASUREMENT SYSTEMS FOR SILICON WAFERS FOR THE 130 nm TO 16 nm TECHNOLOGY GENERATIONS

List of Line Items	Line Item Title
Line Item 1	Adding notes at table 2 and also add note and recommended specification at table 3 to be met with available 200mm wafer metrology tools, and make error correction.
Line Item 2	XXXXX
Line Item 3	XXXXX
Line Item 4	XXXXX
Line Item 5	XXXXX
Line Item 6	XXXXX
Line Item 7	XXXXX
Line Item 8	XXXXX

	Line Item 9	Line Item Title XXXXX
	Line Item 10	Line Item Title XXXXX

Line Item 1 Adjudication

II. Tally

Standards staff to fill in.

Voting Tally: As-cast tally after close of voting period

Note: A minimum of 60% of the Voting Interests that have TC Members within the global technical committee that issued the Letter Ballot must return Votes. (*Regulations* ¶ 9.7.1.1)

Voting Tally (with example values):P

Voting Interest:	Returned Votes		Distribution		Return Rate	
Letter Ballot	57	÷	95	=	60.0%	≥60%
Intercommittee Ballot	25					
Voting Interest Reject(s)	1		Total Voters with Rejects		1	
Voting Interest Accept(s)	34					

Note: See *Regulations* § 3.2.1 for definition of Voting Interest.

III. Rejects

Voting Interest Reject 1 (Voting Interest Name: PWC)

Voter Reject 1 (Voter: Peter Wagner, PWC)

Negative 1

Negative	Referenced Section/ Paragraph	Table 3 and foot note #3 of table 3

	Negative Text	Comments on SEMI Draft Document 6170, Line Item Revision to SEMI M49-1016: GUIDE FOR SPECIFYING GEOMETRY MEASUREMENT SYSTEMS FOR SILICON WAFERS FOR THE 130 nm TO 16 nm TECHNOLOGY GENERATIONS I reject this document based on the following negatives and comments. Negatives: 1. SEMI M49 is not a Specification but it is a Guide. "Guiding" means to help or to advice people when they are developing measurement equipment or when they select equipment for measuring a material parameter. It does not mean that they are obliged to follow the advice but that they can deviate from the guide for good reasons. M49 can also be considered to be a check list when discussing the specifications for measurement equipment between customers and suppliers. Again they may agree on other parameter values than outlined in M49 based on their specific needs. Activities for M49 were started about 20 years ago. There are now two possibilities why some measurement equipment for geometry still deviates from M49: a) The industry still would need tools agreeing with M49 for the specified design rules, but some suppliers of geometry measurement equipment did not care about M49 and they are not capable providing corresponding tools with fmax = 1 mm-1. Then M49 should not be changed and an alternative fmax should not be introduced. This would be misleading for all involved parties. Please remember that M49 is a "Guide". b) There is no need in the semiconductor industry for tools with fmax = 1 mm-1 for some older design rules. Then it would be better to replace fmax = 1 mm-1 by fmax = 0.125 mm-1, provided sufficient evidence is available that this meets the requirements of the wafer manufacturers. Therefore I reject the addition of an alternative fmax to Table 3 in M49. 2. An fmax = 0.125 mm-1 corresponds to a spatial wavelength of 4 mm. It also means that spatial features of wafers with this wavelength are reported attenuated by 50 %. I do not think that this is appropriate for correctly measuring the local flatness (such as SFQR or SBIR) on sites that are only 8 mm wide, see line 1.3 in Table 3. Therefore, again, I reject the addition of an alternative fmax to Table 3 in M49. 3. Measurement results obtained for local flatness using a tool with fmax = 0.125 mm-1 may significantly deviate form results obtained with a tool with fmax = 1 mm-1. A note outlining this is missing in doc 6170. There needs to be a corresponding note explaining this potential difference in measurement results, in case the TC does not agree with my negatives 1 or 2. Therefore I reject the addition of an alternative fmax to Table 3 in doc 6170. 4. The planned footnote #3 of Table 3 should not be introduced in M49. I do not understand why a SEMI standard should be changed for marketing reasons of equipment suppliers. This footnote also states "…the capability of most …. measurement tools..". This means that there are tools available that comply with M49 regarding fmax = 1 mm-1. Why should M49 then be changed? The footnote also states "…should be agreed upon between supplier and user." This is superfluous. As said already, M49 is not a Specification, it is a Guide.

		Specifications are always mutually agreed upon by customers/users and suppliers. Comment: Reading doc 6170 I realized that there are still optional spatial bandwidth ranges for nanotopography measurement. I think they should be removed or the existing ones should be replaced by them, based on the needs of the industry. I know that this is not an issue of the current ballot, but it might be new business for the AWG TF. P. Wagner Burghausen, November 17, 2017					
TF input (optional)							
Withdrawal (check one)		x	No Negative withdrawal made by Voter.				**GO TO "Related" subsection**
			Withdrawal document received by Standards staff on MM/DD/YYYY.				**GO TO "Final" subsection → (A)**
Related	**Motion and Reason (check one)**	x	'Related' is mutually agreed upon. **(Needs no motion.)**				**GO TO "Persuasive" subsection**
			Negative is not related. **(Needs ≥2/3 votes to pass.)**				
			Reason	XXXX			
	Motion by/ 2nd by	**Name (Company)/Name (Company)**					
	Discussion						
	Result of Vote (check one)	XX **Y**-XX **N**; Motion passed/failed.					
			[Negative is not related.] < 2/3				**GO TO "Persuasive" subsection**
			2/3 ≤ [Negative is not related.]				**GO TO "Final" subsection → (B)**
Persuasive	**Motion and Reason (check one)**	x	Negative is related and persuasive. **(Needs >1/3 votes to pass.)**				
			Negative is related and not persuasive. **(Needs ≥2/3 votes to pass.)**				
			Reason				
	Motion by/ 2nd by	Satoshi Yamiyama (Raytex-optima)/Masanori Yoshise (independent)					
	Discussion	none					
	Result of Vote (check one)	8 **Y**-0 **N**; Motion passed					
		x	[Negative is related and persuasive.] > 1/3	**Is a technical change recommended? (check one)**		**Y**	**GO TO "Address by Technical Change Option" subsection**
			[Negative is related and not persuasive.] < 2/3		x	**N**	**GO TO "Final" subsection → (E)**

			2/3 ≤ [Negative is related and not persuasive.] < 90%	**GO TO "Final" subsection → (C)**
			90% ≤ [Negative is related and not persuasive.]	**GO TO "Not Significant Finding Option" subsection**

Address by Technical Change Option

Technical Change Recommendations

Original section/paragraph number and at least one full sentence are required in "FROM" and "TO" fields.

Technical Changes	**1**	**FROM: Section/Paragraph XXX**
		TO: Section/Paragraph xxx
		Justification (If necessary)
	2	**FROM: Section/Paragraph XXX**
		TO: Section/Paragraph xxx
		Justification (If necessary)

Motion		Negative is addressed by the technical change(s).	
Motion by/2nd by		Name (Company)/Name (Company)	
Discussion			
Result of Vote (check one)		XX **Y**-XX **N**; Motion passed/failed.	
		2/3 ≤ [Negative is addressed by the technical change(s).]	**GO TO "Incorporation of the Technical Change" subsection**
		[Negative is not addressed by the technical change(s).] < 2/3	**GO TO "Final" subsection → (E)**
Incorporation of the Technical Change	**Motion**	To incorporate the technical change(s).	
	Motion by/2nd by	Name (Company)/Name (Company)	
	Discussion		
	Result of Vote (check one)	XX **Y**-XX **N**; Motion passed/failed.	
		90% ≤ [Agree to incorporate.]	**GO TO "Final" subsection → (F)**
		[Disagree to incorporate.]>10%	**GO TO "Final" subsection → (E)**

Not Significant Finding Option

This option can be used only "if the TC Chapter finds a Negative not persuasive by a vote equal to or greater than 90% of the persons voting on the action". (*Regulations* ¶ 9.6.4.4.2)

Use of "Not significant finding option" (check one)		It is mutually agreed upon to term the Negative "not significant".	**GO TO "Final" subsection → (D)**
		It is mutually agreed upon to term the Negative "significant".	**GO TO "Final" subsection → (C)**
		Whether or not the Negative is "not significant" is decided by a vote.	
Motion		The Negative is "not significant".	

	Motion by/ 2nd by	Name (Company)/Name (Company)			
	Vote		XX **Y**-XX **N**; Motion passed with simple majority		**GO TO "Final" subsection → (D)**
			XX **Y**-XX **N**; Motion failed with simple majority		**GO TO "Final" subsection → (C)**
Final	**(check if applicable)**		**(A)**	Withdrawn **(counted under h in disposition)**	
			(B)	Not related **(counted under i in disposition)**	
			(C)	Related and not persuasive (significant)	
			(D)	Not significant **(counted under j in disposition)**	
		X	**(E)**	Related and persuasive and not addressed by technical change	**DOCUMENT FAILS**
			(F)	Addressed by technical change **(counted under k disposition)**	
	(check if applicable)		Comment generated. **See Section V-(ii) Comment #** X.		

This table is needed for each Negative.

Disposition of Voting Interest Reject 1

Check only when the Document has not been failed.

#	Original number (#) of Negatives			**(g)**
#	Number of Negatives withdrawn			**(h)**
#	Number of Negatives found not related			**(i)**
#	Number of Negatives found not significant			**(j)**
#	Number of Negatives addressed by technical change **(Negative becomes not significant)**			**(k)**
Final			**g** - (**h** + **i** +**j** + **k**) = 0	**Reject is Not Valid and is not included in the denominator of § VI. *Approval Conditions Check***
			g - (**h** + **i** +**j** + **k**) >0	**Reject is included in the denominator of § VI. *Approval Conditions Check***
			Reject without a Negative	**Not Valid**

Note: If all of the Negatives included with a Reject Vote are withdrawn, determined to be not related, or determined to be not significant, the Reject Vote is not valid. (*Regulations* ¶ 9.4.3.3)
Note: A Negative addressed by a technical change is automatically considered to be not significant. (*Regulations* ¶ 9.6.4.4.2)

IV. Other Technical Issues: None

Note: TC Chapter may choose to address a technical issue that is not part of a Negative received on a Letter Ballot (i.e., a Comment or a reason not addressed by a Vote response) by handling it as a Negative and finding it related and technically persuasive. The TC Chapter may then fail the Document or address such technical issue by using the procedure defined in *Regulations* § 9.6.4.3 to make a technical change to the Document. (*Regulations* ¶ 9.6.2.4.5)

V. Comments

V- (i) Voters' Comments

Commenter 1 (Noel, Podjue/EvEnh) - Comment 1

Comment	**Foot note #3 of Table2 and foot note#3 of Table 3**		
	Significantly improved with my personal thanks to M. Yoshise for his efforts to achieve these simple yet effective changes. **1) P7 & 8 – Table 2 Note #3** **The last line of the note should not be part of it. It seems to have been inadvertently included since it is identical to the heading of the following Table 3. The note should end with a period after "…intended application".** **2) P12 Table 3 Note #3** **The value in parenthesis is the alternative spatial bandwidth requirement for 200mm wafers. It reflects the capability of most 200mm high volume manufacturing measurement tools and should be agreed upon between supplier and user.**		
Action	**The TC Chapter agreed to do one of the following actions.**		
	***No motion is required in this step.**		
		Already addressed by Commenter #, Comment #	
		No further action was taken by the TC Chapter.	
		Refer to the TF for more consideration.	
		New Business	
		Editorial Change	
	Options for editorial change **(check one)**		**Case 1: No vote in this section:**
			To be included and voted on as a group in § VI. *Editorial Changes Other than Those Voted on in § V*.
			Case 2: Voted in this section:
			Original section number and at least one full sentence are required in "FROM" and "TO" fields.
Editorial Changes	**1**	**FROM: Section/Paragraph xxx**	
		TO: Section/Paragraph xxx	
		Justification (If necessary)	
	2	**FROM: Section/Paragraph xxx**	
		TO: Section/Paragraph xxx	

		Justification (If necessary)
Motion		To approve above editorial change(s)
Motion by/2nd by		Name (Company)/Name (Company)
Discussion		XXXX
Vote		XX **Y**-XX **N**; Motion passed/failed.

This table is needed for each Comment.

Commenter 2 (John, Vally/JV Consultant_EvEnh) - Comment 1

Comment			**Significantly improved with my personal thanks to M. Yoshise for his efforts to achieve these simple yet effective changes.**
Action			**The TC Chapter agreed to do one of the following actions.**
			***No motion is required in this step.**
			Already addressed by Commenter #, Comment #
			No further action was taken by the TC Chapter.
			Refer to the TF for more consideration.
			New Business
			Editorial Change
	Options for editorial change **(check one)**		**Case 1: No vote in this section:**
			To be included and voted on as a group in § VI. *Editorial Changes Other than Those Voted on in § V*.
			Case 2: Voted in this section:
			Original section number and at least one full sentence are required in "FROM" and "TO" fields.
Editorial Changes	**1**		**FROM: Section/Paragraph xxx**
			TO: Section/Paragraph xxx
			Justification (If necessary)
	2		**FROM: Section/Paragraph xxx**
			TO: Section/Paragraph xxx
			Justification (If necessary)
Motion			To approve above editorial change(s)
Motion by/2nd by			Name (Company)/Name (Company)

Discussion	XXXX
Vote	XX **Y**-XX **N**; Motion passed/failed.

V-(ii) Comments Created by Handling Negative: none

VI. Editorial Changes Other than Those Voted on in § V: None

VII. Approval Conditions Check:

VII. - (i). Approval Rate

APPROVAL CONDITION 1: All Negatives have been discussed and were withdrawn, found not related, found not persuasive, or addressed by a technical change. (*Regulations* ¶ 9.7.1.2)

APPROVAL CONDITION 2: At least 90% of the sum of valid Voting Interest Accept and Voting Interest Reject Votes must be Accept. (*Regulations* ¶ 9.7.1.3)

Note: If both approval conditions are not satisfied, the Document fails.

		Accepts		(Accepts + Valid Rejects)				
Approval Rate	=		/		=	#DIV/0!		≥90%

VII. – (ii) Approval Level (check one)

Note: See *Regulations* § 9.7.2 for further information.

☐ **Globally Approved (No Ratification Ballot needed):**
Line Item 1 meets the Letter Ballot approval conditions for the global technical committee.

☐ **Need a Ratification Ballot:**
Line Item 1 meets the Letter Ballot approval conditions for the TC Chapter and a Ratification Ballot will be issued to validate technical changes.

Checks for Entire Document Including All Approved Line Items

VIII. Safety Check

Note: This Safety check applies to the entire Standard or Safety Guideline including all the approved Line Items. See § 15 of the *Regulations* for further information.

Motion	☐	**This is not a Safety Document**, when all safety-related information is removed, the Document is still technically sound and complete. (*Regulations* ¶ 8.7.1)
	☐	**This is a Safety Document**, when all safety-related information is removed, the Document is not technically sound and complete. (*Regulations* ¶ 8.7.2)
	☐	Safety Checklist (*Regulations* ¶ 15.3) is complete and has been included with the Document throughout the balloting process. (*Regulations* ¶ 15.1.2)
Motion by/2nd by		Name (Company)/Name (Company)
Discussion		XXXX
Vote		XX **Y**-XX **N**; Motion passed or failed

IX. Intellectual Property (IP) Check

Note: This IP check applies to the entire Standard or Safety Guideline including all the approved Line Items. See § 16 of the *Regulations* for further information.

☐	The TC Chapter meeting chair asked those participating, if they were aware of any potentially material patented technology or copyrighted items* in the Standard or Guideline. (*Regulations* ¶ 8.8.1)		
	☐	No potentially material patented technology or reproduction of copyrighted items is known.	**GO TO SECTION X.**
	☐	Potentially material patented technology or reproduction of copyrighted items is known, but a Letter of Assurance (LOA) or copyright release letter for such items has been obtained or presented to the TC Chapter.	**GO TO SECTION X.**
	☐	Potentially material patented technology or reproduction of copyrighted items is known and use of such materials is technically justified by the TC Chapter, but an LOA or copyright release letter for some of the item(s) has NOT been obtained or presented to the TC Chapter.	
	Motion ☐	Ask ISC for special permission to publish.	
	Motion ☐	Quit activity.	
	Motion ☐	Wait for LOA for patented technology or release of copyrighted items.	
	Motion by/2nd by	Name (Company)/Name (Company)	
	Discussion	XXXX	
	Vote	XX **Y**-XX **N**	
	Final Action	☐	Motion passed
		☐	Motion failed

*** Note: Such potentially material patented technology or copyrighted items might have become known since the Standard or Safety Guideline was last reviewed, or might become relevant due to this Letter Ballot.**

X. Action for This Document

Motion (Check all applicable items)		Line item(s) [X], [X] and [X] passed TC Chapter review as balloted and will be forwarded to the ISC A&R SC for procedural review.
		Line item(s) [X], [X] and [X] passed TC Chapter review with editorial changes and will be forwarded to the ISC A&R SC for procedural review.
		Line item(s) [X], [X] and [X] passed TC Chapter review with technical changes and with or without editorial changes and will be forwarded to the ISC A&R SC for procedural review. A Ratification Ballot will be issued to verify the technical changes.
	x	Line item(s) 1, failed TC Chapter review and will be returned to the TF for rework.
		Line item(s) [X], [X] and [X] failed TC Chapter review and work will be discontinued.
Motion by/ 2nd by		Satoshi Akiyama (raytex-optima) / Masanori Yoshise (independent)
Discussion		None
Vote		9**Y**-0 **N**
Final Action	x	Motion passed
		Motion failed

Standards staff to record the result of the A&R procedural review here:

A&R		**Line item(s) [X], [X] and [X] are Approved for publication**
		Line item(s) [X], [X] and [X] are Approved pending acceptance of the Ratification Ballot
		Line item(s) [X], [X] and [X] are Not approved
	Reason:	