Record of Letter Ballot Review by TC Chapter for Procedural Review

Region/Locale: Japan
Global Technical Committee: Silicon Wafer
TC Chapter Cochairs: Ryuji Takeda/ GlobalWafers Japan, Satoshi Akiyama/ Nanoverse Technologies
Standards Staff: Akiko Yoshida

	Scheduled in Background Statement	Actual
Date	04/17/2026	04/17/2026
Location	SEMI Japan, Tokyo, Japan/ OVTCCM	SEMI Japan, Tokyo, Japan/ OVTCCM
Reason for Change of Date and/or Location (if changed)		

Note: Refer to *Regulations* ¶ 9.5 Exceptions for allowable reason to change.

I. Document Number and Title

Document Number	Document Title
6570D	NEW STANDARD: GUIDE FOR MEASURING BULK MICRO DEFECT DENSITY AND DENUDED ZONE WIDTH IN ANNEALED SILICON WAFERS BY A LASER SCATTERING TOMOGRAPHY TECHNIQUE

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* ¶ 9.6.2.1.1)

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

Voting Interest:	Returned Votes		Distribution		Return Rate	
Letter Ballot	61	÷	101	=	60.40%	≥60%
Intercommittee Ballot	18					
Voting Interest Reject(s)	0				Total Voters with Rejects	0
Voting Interest Accept(s)	46					

III. Rejects

None

IV. Other Technical Issues

None identified

V. Comments

V- (i) Voters' Comments

Commenter 1 (Supika Mashiro/ Tokyo Electron) - Comment 1

Comment	*TF/TC Chapter to fill in section/paragraph #, if necessary.**		
	Comment 3.4 "Dust particles" is an ambiguous term. It would be much clearer if a simple term, such as "particles" is to be used. Clean room cleanliness standards do not differentiate particle types.		
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	
	X	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.***
		X	**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 3.4** 3.4 Dust particles on the examined sample surface could scatter the laser beam and degrade the measurement quality. Therefore, it is recommended to install the equipment in a clean room of class 8 or better (following ISO 14644-1).	
		TO: Section/Paragraph 3.4 3.4 ~~Dust p~~Particles on the examined sample surface could scatter the laser beam and degrade the measurement quality. Therefore, it is recommended to install the equipment in a clean room of class 8 or better (following ISO 14644-1).	
		Justification (If necessary)	

Motion	To approve above editorial change(s)
Motion by/2nd by	Naoyuki Kawai (Self)/ Satoshi Akiyama (Nanoverse Technologies)
Discussion	None.
Vote	9 **Y**-0 **N**; Motion passed.

This table is needed for each Comment accompanied a Vote

Commenter 1 (Supika Mashiro/ Tokyo Electron) - Comment 2

Comment	***TF/TC Chapter to fill in section/paragraph #, if necessary.**
	Comment 3.4 Divide paragraph at the end of first sentence as it has little relevance to the second sentence.

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
	X	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.*
	X	**Case 2: Voted in this section:**
		Original section number and at least one full sentence are required in “FROM” and “TO” fields.

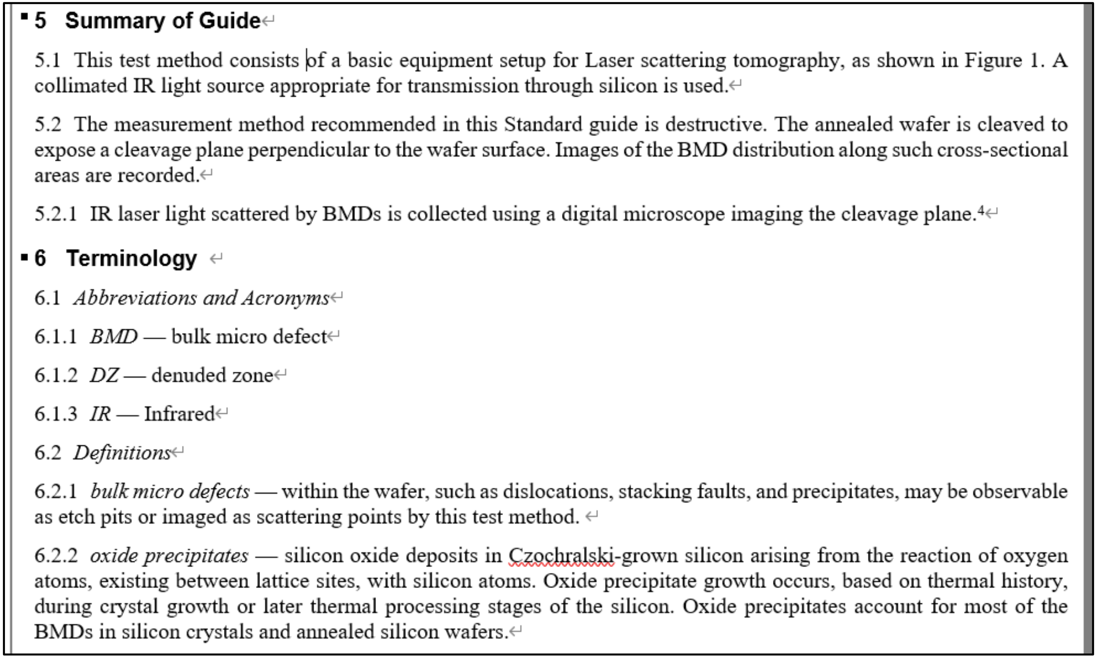
Editorial Changes	1	**FROM: Section/Paragraph** 3.4 3.4 Dust particles on the examined sample surface could scatter the laser beam and degrade the measurement quality. Therefore, it is recommended to install the equipment in a clean room of class 8 or better (following ISO 14644-1). Moreover, the measurement equipment needs to be protected against vibrations, which could strongly deteriorate image quality.
		TO: Section/Paragraph 3.4 3.4 Dust particles on the examined sample surface could scatter the laser beam and degrade the measurement quality. Therefore, it is recommended to install the equipment in a clean room of class 8 or better (following ISO 14644-1). 3.5 The measurement equipment needs to be protected against vibrations, which could strongly deteriorate image quality.
		Justification (If necessary)

Motion	To approve above editorial change(s)
Motion by/2nd by	Naoyuki Kawai (Self)/ Satoshi Akiyama (Nanoverse Technologies)
Discussion	None.
Vote	8 **Y**-0 **N**; Motion passed.

This table is needed for each Comment accompanied a Vote

Commenter 1 (Supika Mashiro/ Tokyo Electron) - Comment 3

Comment	*TF/TC Chapter to fill in section/paragraph #, if necessary.		
	Comment Section 6 (terminology) should be located before section 5 (Summary of Guide)		
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	
	X	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.*
		X	**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 5 & 6**	



▪ **5 Summary of Guide**↵

5.1 This test method consists of a basic equipment setup for Laser scattering tomography, as shown in Figure 1. A collimated IR light source appropriate for transmission through silicon is used.↵

5.2 The measurement method recommended in this Standard guide is destructive. The annealed wafer is cleaved to expose a cleavage plane perpendicular to the wafer surface. Images of the BMD distribution along such cross-sectional areas are recorded.↵

5.2.1 IR laser light scattered by BMDs is collected using a digital microscope imaging the cleavage plane.[4]↵

▪ **6 Terminology** ↵

6.1 *Abbreviations and Acronyms*↵

6.1.1 *BMD* — bulk micro defect↵

6.1.2 *DZ* — denuded zone↵

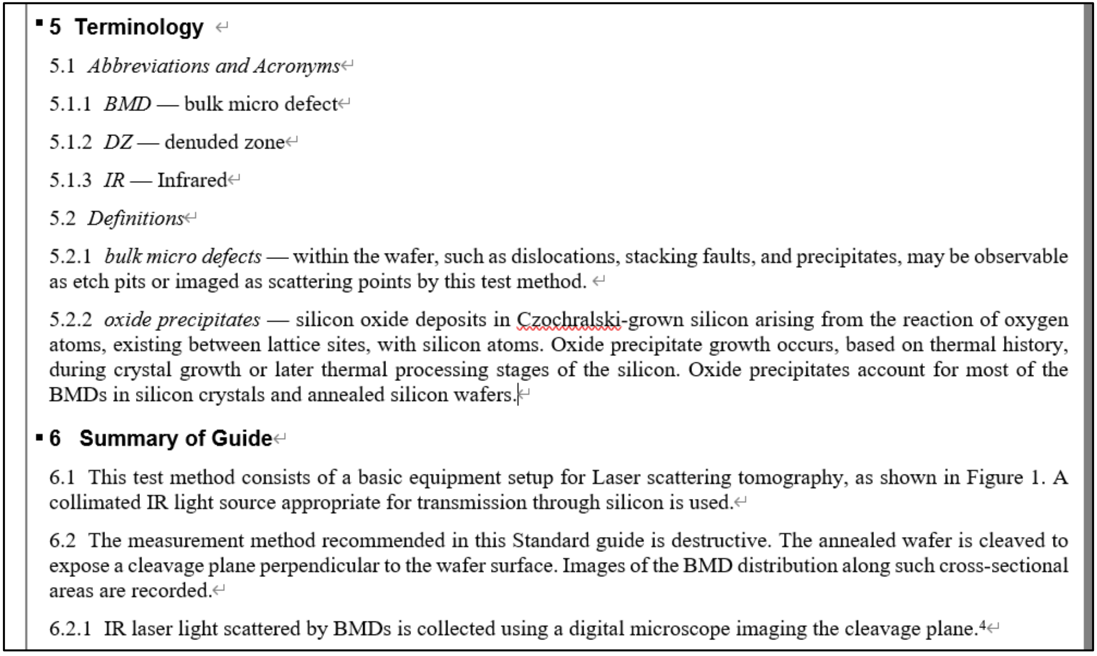
6.1.3 *IR* — Infrared↵

6.2 *Definitions*↵

6.2.1 *bulk micro defects* — within the wafer, such as dislocations, stacking faults, and precipitates, may be observable as etch pits or imaged as scattering points by this test method. ↵

6.2.2 *oxide precipitates* — silicon oxide deposits in Czochralski-grown silicon arising from the reaction of oxygen atoms, existing between lattice sites, with silicon atoms. Oxide precipitate growth occurs, based on thermal history, during crystal growth or later thermal processing stages of the silicon. Oxide precipitates account for most of the BMDs in silicon crystals and annealed silicon wafers.↵

TO: Section/Paragraph 5 and 6



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6 Summary of Guide

6.1 This test method consists of a basic equipment setup for Laser scattering tomography, as shown in Figure 1. A collimated IR light source appropriate for transmission through silicon is used.

6.2 The measurement method recommended in this Standard guide is destructive. The annealed wafer is cleaved to expose a cleavage plane perpendicular to the wafer surface. Images of the BMD distribution along such cross-sectional areas are recorded.

6.2.1 IR laser light scattered by BMDs is collected using a digital microscope imaging the cleavage plane.[4]

Justification (If necessary)

Motion	To approve above editorial change(s)
Motion by/2nd by	Naoyuki Kawai (Self)/ Satoshi Akiyama (Nanoverse Technologies)
Discussion	None
Vote	10 **Y**-0 **N**; Motion passed.

This table is needed for each Comment accompanied a Vote

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* ¶ 9.6.2.1.2)

APPROVAL CONDITION 2: At least 90% of the sum of valid Voting Interest Accept and Voting Interest Reject Votes must be Accept. (*Regulations* ¶ 9.6.2.1.3)

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

		Accepts		(Accepts + Valid Rejects)				
Approval Rate	=	46		46	=	100%		≥90%

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

Note: Refer to *Regulations* § 9.6.2 for further information.

☒ **Globally Approved (No Ratification Ballot needed):**
The Letter Ballot meets the Letter Ballot approval conditions for the global technical committee.

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

VIII. Safety Check

Note: Refer to *Regulations* § 15 for further information.

<table>
<tr><td rowspan="3">**Motion**</td><td colspan="2">X</td><td>**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)</td></tr>
<tr><td colspan="2"></td><td>**This is a Safety Document**, when all safety-related information is removed, the Document is not technically sound and complete. (*Regulations* ¶ 8.7.2)</td></tr>
<tr><td></td><td></td><td>Safety Checklist (*Regulations* ¶ 15.3) is complete and has been included with the Document throughout the balloting process. (*Regulations* ¶ 15.1.2)</td></tr>
<tr><td colspan="3">**Motion by/2nd by**</td><td>Naoyuki Kawai (Self)/ Satoshi Akiyama (Nanoverse Technologies)</td></tr>
<tr><td colspan="3">**Discussion**</td><td>None.</td></tr>
<tr><td colspan="3">**Vote**</td><td>10 **Y**-0 **N**; Motion passed.</td></tr>
</table>

IX. Intellectual Property (IP) Check

Note: This Letter Ballot may cover all or part of a Standard or Safety Guideline. Regardless of the coverage, this IP check applies to the entire Standard or Safety Guideline*. Refer to *Regulations* § 16 for further information.

<table>
<tr><td>X</td><td colspan="6">The TC Chapter meeting chair asked those participating, if they were aware of any patented technology that might be relevant (refer to *Regulations* ¶ 16.3.1.1) to the Standard or Safety Guideline; or, any copyrighted items or trademarks that are used/reproduced (refer to *Regulations* ¶ 16.4.1.2) in the Standard or Safety Guideline. (Also refer to *Regulations* § 8.8)</td></tr>
<tr><td rowspan="3"></td><td>X</td><td>The question is NOT answered in affirmative (No potentially material patented technology or use/reproduction of copyrighted items/trademarks is known.)</td><td colspan="4">**GO TO SECTION X.**</td></tr>
<tr><td rowspan="2"></td><td rowspan="2">The question is answered in affirmative</td><td rowspan="2">Is any of the known IPs a patented technology?</td><td></td><td>**Yes, at least one of them is a patented technology**</td><td>**GO TO IX (a) “Patented Technology” subsection**</td></tr>
<tr><td></td><td>**No**</td><td>**GO TO IX (b) “Copyright items” subsection**</td></tr>
</table>

IX(a) Patented Technologies subsection

IX(a1) Total numbers of Patented Technologies to be dealt with

<table>
<tr><td rowspan="2">**#
Fill number**</td><td rowspan="2">**(l)** Known Patented Technology that might be relevant to the Standard/Safety Guideline</td><td>**#
Fill number**</td><td>**(m)** Number of patented technologies first became known to the TC Chapter on or after the day of the issuance of this Letter Ballot</td><td>**Postpone assessment of such patented technologies to be performed at the next scheduled TC Chapter meeting.**</td></tr>
<tr><td>**#
Fill number**</td><td>**(n)** Number of patented technologies first became known to the TC Chapter before the day of the issuance of this Letter Ballot</td><td>**GO TO IX (a2)**</td></tr>
</table>

IX(a2) Assessment of disclosed patented technologies

Disclosed patented technology #1 (***Brief description, e.g., patent title and number***):			**Date of Assessment** **(If different from the date of Letter Ballot adjudication)** MM/DD/YYYY			
Is disclosed patented technology #1 found to be "might be material" to the Standard/Safety Guideline?		YES (It is a PMPT)	Is the use of this PMPT technically justified?		**YES**	**PROCEED to assess NEXT one, or** **if this is the last one, GO TO IX(a3)**
					NO	**The Document is failed and returned to the TF**
		NO	No further action is needed for patented technology #1			

This table is needed for each disclosed patented technology.

IX(a3) LOA status check of PMPT of which inclusion assessed to be justified

LOA Status of PMPT #1						
Has an LOA for this patented technology been received from every owner ?		YES	**PROCEED to check NEXT one,** **or if this is the last one, GO TO IX(b)**			
		NO	MOTION		Ask ISC for special permission to publish.	
					Quit activity.	**The Document is failed and returned to the TF**
					Wait for LOA	**PROCEED to check NEXT one,** **or if this is the last one, GO TO IX(b1)**
			Motion by/ 2nd by			Name (Company)/Name (Company)
			Discussion			XXXX
			Vote			XX **Y**-XX **N**; Motion passed (or failed)

This table is needed for each PMPT of which inclusion assessed to be justified.

IX(b1) Total numbers of copyrighted items to be dealt with

# **Fill number**	**(o)** Known copyrighted items that are used or reproduced to the Standard/Safety Guideline		**o > 0** There is at least one known copyrighted items that might be relevant to the Standard/Safety Guideline	**GO TO IX (b2)**
			o = 0 There is no disclosed copyrighted item	**GO TO IX (c)**

IX(b2) Assessment of disclosed copyrighted items

Disclosed copyrighted item #1 (***Brief description of its use in the Document***):						
Is disclosed copyrighted item #1 used or reproduced in the Standard/Safety Guideline?		YES	Is the use/reproduction of this copyrighted item technically justified?		YES	**PROCEED to assess NEXT one, or** **if this is the last one, GO TO IX(b3)**

					NO	**The Document is failed and returned to the TF**
		NO	No further action is needed for copyrighted item #1			

This table is needed for each disclosed copyrighted item.

IX(b3) Copyright release status check of copyrighted item of which inclusion assessed to be justified

Copyright release Status of copyrighted item #1						
Has the copyright release been received from its owner ?.		YES	**PROCEED to assess NEXT one, or** **if this is the last one, GO TO IX(c)**			
		NO	MOTION		Ask ISC for special permission to publish.	
					Quit activity.	**The Document is failed and returned to the TF**
					Wait for copyright release letter	**PROCEED to check NEXT one,** **or if this is the last one, GO TO IX(c)**
			Motion by/ 2^{nd} by			Name (Company)/Name (Company)
			Discussion			XXXX
			Vote			XX **Y**-XX **N**; Motion passed (or failed)

This table is needed for each copyrighted item of which use/reproduction assessed to be justified.

IX(c) Assessment of disclosed (identified) trademark

Is there any trademark in the Standard/Safety Guideline?		YES	Is every instance of trademark use technically justified?		YES	**GO TO IX(d)**
					NO	**The Document is failed and returned to the TF**
		NO	**GO TO IX(d)**			

IX(d) IP check completion condition check

The co-chair checks if any Patented Technologies first become known to the TC Chapter on or after the day of the issuance of this Letter Ballot? i.e., m>0 in IX(a1)		YES	**Sections IX(a2) and IX(a3) shall be completed and recorded for such patented technologies at next scheduled meeting of the TC Chapter. Until then, the TC Chapter shall NOT go to X** (making motion to pass/fail this Document) **(refer to *Regulations* ¶16.4.1.2)** **Until then this Letter Ballot Review is on hold.**
		NO	**GO TO X**

X. Action for This Document

Motion		This Document passed TC Chapter review as balloted and will be forwarded to the ISC A&R SC for procedural review.
	X	This Document passed TC Chapter review with editorial changes and will be forwarded to the ISC A&R SC for procedural review.
		This Document 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.
		This Document failed TC Chapter review and will be returned to the TF for rework.
		This Document failed TC Chapter review and work will be discontinued.
Motion by/ 2nd by	Naoyuki Kawai (Self)/ Satoshi Akiyama (Nanoverse Technologies)	
Discussion	None.	
Vote	10 **Y**-0 **N**	
Final Action	X	Motion passed
		Motion failed

Note: If the use of PMPT or copyrighted item is justified by the TC Chapter, LOA or release form must be received before publication can proceed.