

Record of Letter Ballot Review by TC Chapter for Procedural Review

Region/Locale: **North America**

Global Technical Committee: **MEMS/NEMS**

TC Chapter Cochairs: **Steve Martell (Nordson SONOSCAN), Michelle Bourke (Lam Research)**

Standards Staff: **Laura Nguyen**

| | Scheduled in Background Statement | Actual |
|--|-----------------------------------|-------------------|
| Date | TBD | 11/16/2020 |
| Location | TBD | OVTCCM |
| Reason for Change of Date and/or Location (if changed) | | |

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

I. Document Number and Title

| | |
|---------------------------------------|--|
| Document Number 6007 | Document Title New Standard: Guide for Use of Test Patterns for Characterizing a Deep Reactive Ion Etching (DRIE) Process |
|---------------------------------------|--|

II. Tally

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)

Voting Tally:

| Voting Interest: | Returned Vote | | Distributio | | Return Rate | |
|---------------------------|---------------|---|---------------------------|---|--------------|------|
| Letter Ballot | 41 | ÷ | 65 | = | 63.1% | ≥60% |
| Intercommittee Ballot | 5 | | | | | |
| | | | | | | |
| Voting Interest Reject(s) | 1 | | Total Voters with Rejects | | 1 | |
| Voting Interest Accept(s) | 36 | | | | | |
| | | | | | | |

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

III. Rejects

Voting Interest Reject 1 (Voting Interest Name: SEC)

Voter Reject 1 (Voter: Tsukasa Fukunaga/Shin-Etsu Polymer Co.)

Negative 1

| | | | | | | | |
|--------------------------------|--|--|---|---|--------------------------------|---|---|
| Negative | Referenced Section/ Paragraph | Voting page on Web site | | | | | |
| | Negative Text | Wrong document number is on the header, '6007', instead 6607. | | | | | |
| TF input (optional) | | | | | | | |
| Withdrawal (check one) | <input checked="" type="checkbox"/> | No Negative withdrawal made by Voter. | | GO TO "Related" subsection | | | |
| | <input type="checkbox"/> | Withdrawal document received by Standards staff on MM/DD/YYYY. | | GO TO "Final" subsection → (A) | | | |
| Related | Motion and Reason (check one) | <input checked="" type="checkbox"/> | 'Related' is mutually agreed upon. (Needs no motion.) | | GO TO "Persuasive" subsection | | |
| | | <input type="checkbox"/> | Negative is not related. (Needs ≥2/3 votes to pass.) | | | | |
| | | Reason | XXXX | | | | |
| Persuasive | Motion and Reason (check one) | <input type="checkbox"/> | Negative is related and persuasive. (Needs >1/3 votes to pass.) | | | | |
| | | <input checked="" type="checkbox"/> | Negative is related and not persuasive. (Needs ≥2/3 votes to pass.) | | | | |
| | | Reason | Typo on the Voting Web page | | | | |
| | Motion by/ 2 nd by | Michelle Bourke (Lam Research) / Mary Ann Maher (SoftMEMS LLC) | | | | | |
| | Discussion | None | | | | | |
| | Result of Vote (check one) | 5 Y- 0 N; Motion passed. | | | | | |
| | | <input type="checkbox"/> | [Negative is related and persuasive.] > 1/3 | Is a technical change recommended? (check one) | <input type="checkbox"/> | Y | GO TO "Address by Technical Change Option" subsection |
| | | <input type="checkbox"/> | [Negative is related and not persuasive.] < 2/3 | | <input type="checkbox"/> | N | GO TO "Final" subsection → (E) |
| | | <input type="checkbox"/> | 2/3 ≤ [Negative is related and not persuasive.] < 90% | GO TO "Final" subsection → (C) | | | |
| | | <input checked="" type="checkbox"/> | 90% ≤ [Negative is related and not persuasive.] | GO TO "Not Significant Finding Option" subsection | | | |
| 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 ¶ 9.6.1.4.5.2) | | | | | | |
| | Use of "Not significant finding option" (check one) | <input type="checkbox"/> | It is mutually agreed upon to term the Negative "not significant". | | GO TO "Final" subsection → (D) | | |
| | | <input checked="" type="checkbox"/> | 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. | |
| Final | (check if applicable) | (A) | Withdrawn (counted under h in disposition) | |
| | | (B) | Not related (counted under i in disposition) | |
| | | X (C) | Related and not persuasive (significant) | |
| | | (D) | Not significant (counted under j in disposition) | |
| | | (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.

Negative 2

| | | | | | | |
|------------------------|---|--|---|--|--------------------------------|--------------------------------|
| Negative | Referenced Section/ Paragraph | 5.2.9 | | | | |
| | Negative Text | In 5.2.9, the order of the etch rate definition seems reversed. It should be 'the etch depth divided by the process time'. | | | | |
| 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 | 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 | | | |
| 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 | XXXX | | |
| | Motion by/ 2 nd by | Mary Ann Maher (SoftMEMS LLC) / Michelle Bourke (Lam Research) | | | | |
| | Discussion | None | | | | |
| | Result of Vote (check one) | 4 Y-0 N; Motion passed. | | | | |
| | | X | [Negative is related and persuasive.] > 1/3 | Is a technical change recommended? (check one) | X | Y |
| | | [Negative is related and not persuasive.] < 2/3 | | | 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 5.2.9 | | 5.2.9 <i>etch rate</i> — the total process time divided by the total etch depth, typically given in µm/min. | |
| | | | | | | TO: Section/Paragraph 5.2.9 | | 5.2.9 <i>etch rate</i> — the total <u>etch depth divided by the total plasma</u> process time divided by the total etch depth , typically given in µm/min. | |
| | | | | | | Justification (If necessary) | | Definition was error in order. We got the words the wrong way around and added clarification to process time by adding the word "plasma". | |
| | | | | | 2 | FROM: Section/Paragraph (add new definition) | | | |
| | | | | | | TO: Section/Paragraph Section 5.2 Definitions | | <u>plasma process time</u> — the total time the plasma is applied (i.e. ignited). | |
| | | | | | | Justification (If necessary) | | Added definition of "plasma process time" to clarify the change to the etch rate to definition in section 5.2.9. | |
| | | | | Motion | | Negative is addressed by the technical change(s). | | | |
| | | | | Motion by/2 nd by | | Farzad Khademolhosseini (A.M. Fitzgerald & Associates, LLC) / Mary Ann Maher (SoftMEMS LLC) | | | |
| Discussion | | None | | | | | | | |
| Result of Vote (check one) | | 5 Y- 0 N; Motion passed. | | | | | | | |
| Incorporation of the Technical Change | Motion | | To incorporate the technical change(s). | | | | | | |
| | Motion by/2 nd by | | Michelle Bourke (Lam Research) / Mary Ann Maher (SoftMEMS LLC) | | | | | | |
| | Discussion | | None | | | | | | |
| | Result of Vote (check one) | | 4 Y- 0 N; Motion passed. | | | | | | |
| | | | <input checked="" type="checkbox"/> 2/3 ≤ [Negative is addressed by the technical change(s).] | GO TO "Incorporation of the Technical Change" subsection | | | | | |
| | | | <input type="checkbox"/> [Negative is not addressed by the technical change(s).] < 2/3 | GO TO "Final" subsection → (E) | | | | | |
| Final | (check if applicable) | <input type="checkbox"/> (A) | Withdrawn (counted under h in disposition) | | | | | | |
| | | <input type="checkbox"/> (B) | Not related (counted under i in disposition) | | | | | | |
| | | <input type="checkbox"/> (C) | Related and not persuasive (significant) | | | | | | |
| | | <input type="checkbox"/> (D) | Not significant (counted under j in disposition) | | | | | | |
| | | <input type="checkbox"/> (E) | Related and persuasive and not addressed by technical change | DOCUMENT FAILS | | | | | |
| | | <input checked="" type="checkbox"/> (F) | Addressed by technical change (counted under k disposition) | | | | | | |
| | (check if applicable) | <input type="checkbox"/> | 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.

| | | | |
|-------|--|---------------------------|---|
| 2 | Original number (#) of Negatives | (g) | |
| 0 | Number of Negatives withdrawn | (h) | |
| 0 | Number of Negatives found not related | (i) | |
| 0 | Number of Negatives found not significant | (j) | |
| 1 | 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 |
| | X | $g - (h + i + j + k) > 0$ | 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* ¶ 9.6.1.4.5.2)

IV. Other Technical Issues

None

V. Comments

V- (i) Voters' Comments

Commenter 1 ([Rafael Vargas-Bernal/ITSdl](#)) - Comment 1

| | | | |
|---------|---|--|--|
| Comment | Reference in 11.1 is incomplete. | | |
| Action | The TC Chapter agreed to do one of the following actions. | | |
| | *No motion is required in this step. | | |
| | <input type="checkbox"/> | Already addressed by Commenter #, Comment # | |
| | <input type="checkbox"/> | No further action was taken by the TC Chapter. | |
| | <input type="checkbox"/> | Refer to the TF for more consideration. | |
| | <input type="checkbox"/> | New Business | |
| | <input checked="" type="checkbox"/> | Editorial Change | |
| | Options for editorial | <input type="checkbox"/> | 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. |
| | | <input checked="" type="checkbox"/> | Case 2: Voted in this section: |

| | | | | |
|------------------------------|---|--|--|---|
| | | change (check one) | | Original section number and at least one full sentence are required in "FROM" and "TO" fields. |
| Editorial Changes | 1 | FROM: Section/Paragraph 11.1 | | |
| | | 11.1 Handbook of Silicon Based MEMS Materials and Technologies (Second Edition), Micro and Nano Technologies (2015): pp. 444–469; https://www.sciencedirect.com/science/article/pii/B978032329965700021X | | |
| | | TO: Section/Paragraph 11.1 | | |
| | | 11.1 Laermer, F., Franssila, S., Sainiemi, L., and Kolari, K., Deep Reactive Ion Etching, Tilli, M., Paulasto-Kröckel, M., Motooka, T., Lindroos, V., eds., Handbook of Silicon Based MEMS Materials and Technologies (Second Edition), Micro and Nano Technologies William Andrew, pp. 444–469 (2015). pp. 444–469; https://www.sciencedirect.com/science/article/pii/B978032329965700021X | | |
| | | Justification (If necessary) Reference was incomplete. | | |
| Motion | | To approve above editorial change(s) | | |
| Motion by/2 nd by | | Michelle Bourke (Lam Research) / Mary Ann Maher (SoftMEMS LLC) | | |
| Discussion | | None | | |
| Vote | | 5 Y- 0 N; Motion passed. | | |

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)

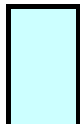
APPROVAL CONDITION 2: At least 90% of the sum of valid Voting Interest Accept and Voting Interest Reject Votes must be Accept. (*Regulations* ¶ 9.6.2.1.3)

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

| | | | | | | | | |
|---------------|---|---------|---|---------------------------------|---|-------|--|------|
| | | | | | | | | |
| | | Accepts | | (Accepts + Valid Rejects) | | | | |
| Approval Rate | = | 36 | / | 37 | = | 97.3% | | ≥90% |
| | | | | | | | | |
| | | | | | | | | |

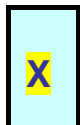
VII. – (ii) Approval Level (check one)

Note: See 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: See Regulations § 15 for further information.

| | | |
|------------------------------|-------------------------------------|---|
| Motion | <input checked="" type="checkbox"/> | This is not a Safety Document , when all safety-related information is removed, the Document is still technically sound and complete. (<i>Regulations ¶ 8.7.1</i>) |
| | <input type="checkbox"/> | This is a Safety Document , when all safety-related information is removed, the Document is not technically sound and complete. (<i>Regulations ¶ 8.7.2</i>) |
| | <input type="checkbox"/> | Safety Checklist (<i>Regulations ¶ 15.3</i>) is complete and has been included with the Document throughout the balloting process. (<i>Regulations ¶ 15.1.2</i>) |
| Motion by/2 nd by | | Mary Ann Maher (SoftMEMS LLC) / Mark Camenzind / CAMENZIND SOLUTIONS |
| Discussion | | None |
| Vote | | 4 Y-0 N; Motion passed. |

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*. See *Regulations § 16* for further information.

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

X. Action for This Document

| | | |
|----------------------------------|-------------------------------------|--|
| Motion | <input type="checkbox"/> | This Document passed TC Chapter review as balloted and will be forwarded to the ISC A&R SC for procedural review. |
| | <input type="checkbox"/> | This Document passed TC Chapter review with editorial changes and will be forwarded to the ISC A&R SC for procedural review. |
| | <input checked="" type="checkbox"/> | 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. |
| | <input type="checkbox"/> | This Document failed TC Chapter review and will be returned to the TF for rework. |
| | <input type="checkbox"/> | This Document failed TC Chapter review and work will be discontinued. |
| Motion by/ 2 nd by | | Michelle Bourke (Lam Research) / Mary Ann Maher (SoftMEMS LLC) |
| Discussion | | None |
| Vote | | 4 Y-0 N |
| Final Action | <input checked="" type="checkbox"/> | Motion passed |
| | <input type="checkbox"/> | 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.