



STANDARDS NEW ACTIVITY REPORT FORM (SNARF)

Date Prepared: July 19, 2021 Revised (if Applicable): _____

SNARF for: New Standard: Specification for Shipping Container for Transport of Transmission Electron Microscope (TEM) Lamella Carriers (LC) from LC-supplier to LC-end user

Originating Global Technical Committee: Physical Interfaces & Carriers

Originating TC Chapter: North America

Task Force (TF) in which work is to be carried out: Electron Microscopy Workflow (EMW) TF

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Refer to *Procedure Manual* § 2.2.4 for more information on properly filling out the SNARF.

1. Rationale:

a: Describe the need or problem addressed by this activity.

(Indicate the customer, what benefits they will receive, and if possible, quantify the impact on the return on investment [ROI] if the Document is implemented.)

In 2019 the PIC TC Chapter approved SEMI E177 specifying the lamella carriers (LCs) used in Transmission Electron Microscopy (TEM) investigations. This was a first step for enabling automated workflows for TEM investigations in a fab environment. For a fully automated workflow, standardization of other steps and components is required. A new activity was started in 2019 to develop a standard for a LC container (LCC) as the LCs need to be transported between the different tools in a fab or lab that are part of the TEM workflow (FIB-SEM, plasma cleaner, TEM, storage). For this a well-defined, standardized container is required - similarly to FOUPs used for transporting silicon wafers - so that the interfaces of the various tools used can be designed and which complies with existing automated transport systems. This LCC is intended only for transporting the LCs within a fab/lab and possibly also for long term storage but **not** for shipping the LCs from the LC manufacturers to the LC customers/end-users.

However, to ensure that LCs can be automatically transferred from the shipping container into a FIB-SEM system or LCC, such LC shipping container needs to be compatible with the automation infrastructure that will be developed at system level around the LC and LCC Standards. Currently used LC shipping boxes are not compatible with the envisaged automation infrastructure based on what currently is known and specified for the LCC. Hence, the proposed new activity aims at specifying the relevant characteristics of a new LC shipping container to ensure its compatibility with automated TEM workflows within a fab/lab; the new shipping container and existing LCC activities will run in parallel as shipping container specifications will derive from LCC specifications. Co-development of both LCC and LC shipping container is required to guarantee that interdependencies are correctly captured and that both elements are available for early automated TEM workflow implementations in Semiconductor fabs/labs.



b: Estimate effect on industry. Check one of the following:

1: Major effect on entire industry or on multiple important industry sectors

- identify the relevant sectors: _____

2: Major effect on an industry sector

- identify the relevant sector: Suppliers and users of FIB, SEM, TEM, cleaning and storage equipment. Suppliers of Lamella Carriers (LC), Lamella Carriers Containers (LCC) and Lamella Carriers Shipping Containers

3: Major effect on a few companies

- identify the relevant companies: _____

4: Slight effect or effect not determinable

c: Estimate technical difficulty of the activity. Check one of the following:

I: No Difficulty – Proven concepts and techniques exist or quick agreement is anticipated

II: Some Difficulty – Disagreements on known requirements exist, but developing consensus is possible

III: Difficult – Limited expertise and resources exist and/or achieving consensus is difficult

IV: Extremely Difficult – Expertise and resources are scarce and/or achieving consensus is very difficult

2. Scope:

a: Describe the technical areas to be covered or addressed by this Document development activity.

(For Subordinate Standards, list common concepts or criteria that the Subordinate Standard inherits from the Primary Standard, as well as differences from the Primary Standard.)

- The new standard will specify the form factor, parts and physical dimensions of the LC shipping container.
- It will also specify the detailed design of the LC shipping container such as the pockets/slots for the LCs and kinematic coupling features.
- It will also specify physical features related to the handling, transport and identification of the LC shipping containers (e.g., fiducials for alignment, ID location, etc.)
- It will also specify material choices/characteristics in relation to the envisaged use case (consumable, single use) and constraints (anti-statics, outgassing, optical properties,..)
- In addition, the new standard will define new terms related to this activity.
- It is envisaged that the LCC and LC shipping container have several specifications in common and that the LC shipping container will be a 'light version' of the LCC but with adapted specifications for e.g., number of LC pockets/slots and physical dimensions.

b: Expected result of activity

New Standard or Safety Guideline (including replacement of an existing Standard or Safety Guideline)

New Subordinate Standard to an existing Standard or to a new Primary Standard to be developed concurrently with this new Subordinate Standard

New Preliminary Standard

Major revision to an existing Standard or Safety Guideline

Line-item revision to an existing Standard or Safety Guideline

Line-item revision to two or more existing Standards or Safety Guidelines

Reapproval of a Standard or Safety Guideline

Removal of a Standard or Safety Guideline

Withdrawal of a Standard or Safety Guideline

Reinstatement of a Standard or Safety Guideline

Publication of an existing Standard or Safety Guideline as an American National Standard

New Auxiliary Information

Modification of existing Auxiliary Information



For a new Subordinate Standard, identify the Primary Standard here: _____

For revision of existing Standard(s) or Safety Guideline(s), identify the Standard(s) or Safety Guideline(s) that are to be revised here: _____, and identify which parts of the Standard(s) or Safety Guideline(s) that are to be revised. (Check all that apply.)

- Modification of an existing part of Standard(s) or Safety Guideline(s) including Appendices, Complementary Files, and Supplementary Materials**
- Addition of one or more Appendices or Complementary Files to an existing Standard or Safety Guideline**
- Addition of one or more Related Information sections or Various Materials to an existing Standard or Safety Guideline**
- Revision or addition of one or more Subordinate Standards to an existing Primary Standard**

For Standards, identify the Standard Subtype below:

- Classification
- Practice
- Test Method
- Miscellaneous (describe:)
- Guide
- Specification
- Terminology

3. Projected Timetable for Completion:

a: General Milestones

- a. Activity Start: August 13, 2021
- b. 1st Draft by: January, 2022
- c. (Optional) Informational Ballot by: _____
- d. Letter Ballot by: April, 2022
- e. TC Chapter Approval By: September, 2022

4. Liaisons:

a: List SEMI Global Technical Committees, TC Chapters, Subcommittees, or Task Forces in your or other Regions/Locales that should be kept informed regarding the progress of this activity.
(Refer to SEMI Standards organization charts and global technical committee charters as needed.)

b: List any planned Type I Liaisons with external nonprofit organizations (e.g., SDO) that should receive Draft Documents from Standards staff for feedback during this activity and be notified when the Letter Ballot is issued (see Procedure Manual § 7).

c: Intercommittee Ballots (check one):

- will be issued – identify the recipient global technical committee(s):** _____
- will not be issued**

5. Safety Considerations:

The resulting Document is expected (Check one):

- to be a Safety Guideline**
- NOT to be a Safety Guideline**

NOTE FOR 'to be a Safety Guideline': When all safety-related information is removed from the Document, the Document is NOT technically sound and complete – Refer to § 15.1 of the *Regulations* for special procedures to be followed.

NOTE FOR 'NOT to be a Safety Guideline': When all safety-related information is removed from the Document, the Document is still technically sound and complete.

6. Intellectual Property Considerations:

a: For a new Standard or Safety Guideline and for any part to be modified or added in a Revision of published Standards and Safety Guidelines (Check one):

the use of patented technology is NOT required.

patented technology is intended to be included in the proposed Standard(s) or Safety Guideline(s).

(If the second box is checked, check one):

Letter of Intent received

Letter of Intent not received

b: For Revision, Reapproval, Reinstatement, or Withdrawal of existing Standard(s) and Safety Guideline(s) (Check one):

there is no known material patented technology necessary to use or implement the Standard(s) and Safety Guideline(s)

there is previously known material patented technology necessary to use or implement the Standard(s) and Safety Guideline(s)

c: The body of the Document and any Appendices, Complementary Files, Related Information sections, or Various Materials that may or may not be a part of the Document by reference (Check one):

will incorporate Copyrighted Item

the incorporation of Copyrighted Item will NOT be required

NOTE FOR 'the use of patented technology or the incorporation of Copyrighted Item(s) is NOT required': If in the course of developing the Document, it is determined that the use of patented technology or Copyrighted Item(s) is necessary for the Document, the provisions of *Regulations* § 16 must be followed.

NOTE FOR 'will incorporate Copyrighted Item': A copyright release letter must be obtained from the copyright owner prior to publication.

7. Comments, Special Circumstances:

8. TC Member Review (Check one):

took place between (put dates here: 07/28/2021 and 08/11/2021) before approval at the TC Chapter Meeting, or

took place between (put dates here: MM/DD/YYYY and MM/DD/YYYY) before approval by the GCS, or

is not required for this SNARF.

NOTE FOR 'TC Member Review': A TC Member Review is required by the *Regulations* for a period of at least two weeks before approval of a new, or a major revision of an existing, Standard or Safety Guideline. (See *Regulations* ¶ 8.2.1)

9. Approval Dates:

TC Chapter or GCS: TC Chapter on August 12, 2021
Recorded in TC Chapter Minutes: _____