

SAMPE CANADA - CKN  
- CANCOM 2026  
STUDENT COMPETITION  
RULES AND GUIDELINES



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## Contents

1. Premise and Summary .....	2
2. Contest Intentions.....	2
3. Geometric Criteria.....	2
4. Materials and Fabrication .....	3
4.1. Raw Materials .....	3
4.2. Natural Fibers.....	3
4.3. Core Materials.....	3
4.3.1. Natural Core Materials.....	3
4.4. Prohibited Materials .....	3
4.5. Sustainable Materials.....	3
4.6. Fabrication .....	3
5. Team Composition .....	4
6. Participation.....	4
6.1. Registration.....	4
6.2. Proposal .....	4
6.3. Day of Competition .....	5
6.3.1. Mass Measurement .....	5
6.3.2. Setup for Loading .....	5
6.3.3. Loading Parameters .....	5
6.3.4. Sustainability Assessment.....	5
7. Scoring.....	6
7.1. Performance Evaluation.....	6
7.2. Sustainability Evaluation .....	6
7.3. Tie Breaker .....	6
8. Concluding Comments .....	6

## 1. Premise and Summary

Lightweight, transportable structures/habitats will become a necessity if humans intend to colonize other planets.

*Challenge: design and build a miniature, lightweight habitat from composite materials that will sustain a minimum compressive load between two plates.*

Participation is simple! Students are asked to:

- 1. Form a team (including a faculty advisor)**
- 2. Register and submit a brief proposal**
- 3. Develop and build an enclosure from composite materials**
- 4. Create a short video on the development process**
- 5. Attend CANCOM 2026 on August 10, 2026 with the enclosure and video, and compete**

## 2. Contest Intentions

This contest is intended to be a fun, hands-on way for students to learn more about designing and manufacturing parts with composite materials. This is intended to make students aware of the potential of composite materials and possible related career paths.

Students that compete in the competition must be enrolled in an accredited university, college, or community college to participate and be 18 years of age or older or have permission from a parent or guardian.

The rules and guidelines in this document are to be considered an outline and may be subject to interpretation. Please contact SAMPE Canada for clarification if required.

## 3. Geometric Criteria

The habitat must fit within an envelope of 20 cm X 20 cm X 20 cm and enclose a volume of 1400 cm<sup>3</sup> or more. A box will be placed over the habitat to ensure it fits within the envelope. Openings will be sealed with packing tape and a flexible bladder will be inserted into the habitat, that will be filled with a liquid to measure the volume. No internal columns/posts/pillars are allowed. The internal volume must be open from the bottom.

Each habitat must have two access ports that consist of open cut outs. A 30 mm X 30 mm X 30 mm cube representing the inhabitant must be able to pass through the ports.

## 4. Materials and Fabrication

Materials and processes used to build the habitat are at the final discretion of the SAMPE Canada Governing Committee.

### 4.1. Raw Materials

All modulus carbon fibers (standard, immediate and high) are permitted. All polymeric matrices (vinyl ester, polyester, epoxy, etc.) are permitted.

### 4.2. Natural Fibers

Permitted natural fibers must be naturally occurring in fiber form. Basalt and similar fibers are not permitted because they are naturally occurring minerals, not fibers. Animal hair and/or fiber is not permitted.

### 4.3. Core Materials

Approved core materials include but are not limited to aluminum honeycomb, glass/phenolic honeycomb, foam, solid wood and wood laminates. Wood laminates can be purchased or self-laminated. Other materials shall be submitted to the Governing Committee for approval.

#### 4.3.1. Natural Core Materials

To be considered natural the core materials must be naturally occurring, such as solid wood or wood laminates. Wood laminates can be purchased or self-laminated but cannot contain non-naturally occurring reinforcements, fillers or additives between wood layers.

### 4.4. Prohibited Materials

Hazardous materials, metal (excluding honeycomb), boron fibers are prohibited in all categories.

### 4.5. Sustainable Materials

Natural fibre and natural core materials are considered to be sustainable materials for the purpose of this competition. Recyclable matrix materials are also considered sustainable for the purpose of this competition. Note: recyclability may need to be defined by the student team and acceptance will be under the discretion of the SAMPE Canada Governing Committee. Thermosetting matrix material that is derived from natural/sustainable feedstock will be considered sustainable at a penalty of 50% (ie. if 60% of the mass of the habitat is composed of resin derived from natural/sustainable feedstock then this will be considered as 30% in terms of the sustainability criteria).

### 4.6. Fabrication

Acceptable methods of fabrication/manufacturing/processing include hand layup (prepreg or wet layup), compression molding, vacuum assisted resin transfer molding (VARTM) and resin transfer molding (RTM). Processing in an oven, autoclave and press are permitted. Filament winding is not permitted. Please contact the SAMPE Canada Governing Committee if there is any uncertainty.

## 5. Team Composition

An individual team shall have no more than five members. At least one member must be a SAMPE member. At least one member must be a CACSMA member. Each team will represent a single institution. Teams composed of students from multiple institutions may participate in the competition, however they must identify one institution to represent. Each team must have a faculty advisor associated with the institution they are representing. Approval of the team is subject to the SAMPE Canada Governing Committee prior to registration.

## 6. Participation

The competition process involves the following milestones:

Milestone	Date
Register	February 28, 2026
Submit proposal	April 30, 2026
Approval for proposal	May 31, 2026
Competition and video poster submission	August 10, 2026

### 6.1. Registration

To participate in the competition, teams must register by February 28, 2026. Please contact the SAMPE Canada Governing Committee if your team has missed the deadline. Late registration may be available depending on interest. Registered teams will receive a Habitat Registration Number via email. If you are unable to locate your number, please contact the Governing Committee.

### 6.2. Proposal

All teams must submit a design proposal for each registered habitat for review and approval by the SAMPE Canada Governing Committee no later than April 30, 2026. Approval will be communicated by May 31, 2026. Please use the proposal template for this application.

Proposals shall include the following elements:

1. **Cover Page:** The cover page shall include the following:
  - a. Institution name
  - b. Team member names with one team member identified as the team lead. An email address shall be provided for the team lead as a point of contact for the SAMPE Canada Governing Committee.
  - c. Faculty advisors name and contact information, including email address and phone number.
2. **Description:** Approximately 500 word or less written description of the habitat. The description shall include but is not limited to details of the design, materials used, layup schedule, manufacturing process and analysis (if completed) to assess the structural capability.

3. **Part Drawings:** Drawings with dimensions and different views including a section view are recommended. Drawings are not required to be done in a CAD based software.

Approval: The SAMPE Canada Governing Committee will reply to teams either approving the submitted proposal or provide feedback. If feedback is provided, teams may need to clarify details or make changes, and resubmit the proposal for approval.

### 6.3. Day of Competition

At least one team member must be present with their enclosure to compete.

Assessment will take place on the first day of the CANCOM 2026 conference (August 10, 2026) on the University of British Columbia campus in Vancouver, BC, Canada. Testing will be performed by an official. Results are expected to be posted in real time. Prize winners are expected to be announced shortly after.

All teams must submit a short video poster for each registered habitat. The video poster shall highlight details about the design, materials, manufacturing process, and analysis and testing (if completed) to assess the structural capability. Videos are expected to be succinct with a maximum length of five minutes. Videos shall be in a downloadable format, such as MP4, AVI or WMV. If the file is located on a Google Drive, please ensure access is given to the SAMPE Canada Governing Committee. YouTube videos will not be accepted as a valid submittal. SAMPE Canada reserves the right to post these publicly for promotional purposes.

#### 6.3.1. Mass Measurement

Each enclosure will be placed on a balance prior to loading. Measurements will be taken by an official and recorded.

#### 6.3.2. Setup for Loading

Teams are permitted to setup their own habitat in the load frame with guidance from an official. Two team members maximum are permitted to do so. A time limit of one minute is allowed.

#### 6.3.3. Loading Parameters

Habitats will be loaded in a universal load frame between two flat steel plates at a rate of 2 mm/min up to 20 kN. No more than 5 mm of deflection is permitted under this load. The plates will have dimensions of 20 cm X 20 cm or greater.

#### 6.3.4. Sustainability Assessment

Sustainability will be assessed on the mass percentage of natural materials used in the habitat. Teams must submit a breakdown of the mass of various materials used in the habitat. This can be determined based on analysis rather than direct measurement.

## 7. Scoring

Awards are given in two categories: performance and sustainability. Monetary prizes will be awarded for 1<sup>st</sup> and 2<sup>nd</sup> place in performance and 1<sup>st</sup> place in sustainability. The monetary awards are \$500 for 1<sup>st</sup> place, \$300 for 2<sup>nd</sup> place in performance and \$200 for 1<sup>st</sup> place in sustainability.

### 7.1. Performance Evaluation

Habitats that sustain the proof load will be ranked based on their mass. The habitat with the lowest mass (that can sustain the 20 kN compressive load) wins first place. The habitat with the second lowest mass (that can sustain the proof load) will win second place.

If no habitats sustain the proof load, they will be ranked based on the maximum load they do sustain.

### 7.2. Sustainability Evaluation

Sustainability will be evaluated on the mass percentage of natural materials used in the habitat. Habitats that sustain the proof load will be ranked based on the percent of natural materials used. The habitat with the greatest percent wins first place.

### 7.3. Tie Breaker

In the event of a tie (as defined as results being within 2% of each other) the team's video poster will be used to determine a winner.

## 8. Resources

You can find these rules and current information posted on the CKN Knowledge in Practice Centre (KPC) website here: <https://compositeskn.org/KPC/A400>

As well as a case study on a prototype entry here: <https://compositeskn.org/KPC/C121>

Don't forget that the Knowledge in Practice Centre is a great resource for all your composites knowledge needs: <https://compositeskn.org/KPC/A1>

## 9. Concluding Comments

Again, this is intended to be a fun, safe, and fair event for everyone involved. The overall objective is to spread awareness of composite materials and get more people involved in SAMPE Canada and the field in general. If there are any questions, please feel free to reach out to SAMPE Canada for more information. We look forward to seeing everyone at the competition in August, 2026 at CANCOM 2026.



## APPENDIX

## SAMPE CANADA – CKN - CANCOM 2026

### STUDENT COMPETITION

#### -Application Cover Page-

#### Group members:

The following group members would hereby apply to participate in the SAMPE Canada – CKN - CANCOM 2026 Student Competition. Note: up to five members are allowed per group

Group Member:	Signature:	Email address:
*		

*\*Note: the first group member listed is considered the team lead and will serve as the primary contact*

#### Faculty Advisor:

The following faculty member has agreed to advise this group.

Advisor:	Signature:	Email address:

#### Institution:

Institution Name:	City, Province, Country

Note: if team members are not enrolled at the institution above, please note which institution they are enrolled at below.



Description of the habitat (~500 words or less):

Proposed part drawings: