



WATER-ROCKET VEHICLE COMPETITION RULES

The Mission:

The mission is to design a Water-Rocket Vehicle capable of reaching the highest altitude possible given a specific launch criteria to achieve the longest hang time. The objective of the contest is for each team to construct a rocket propelled by water and air which will be launched at approximately a **90 degree angle** to reach the maximum height possible and maintain the longest “hang time.”

Design and Contest Rules:

1. Each design team must consist of three (3) students.
2. On the day of the competition **a completed entry form, an actual operating rocket, and a patch design must be submitted to qualify for the event and to compete.**

Note: At this time, each entry must pass a visual inspection and height requirement in order to be eligible to compete. Entries that fail inspection will be given ONE opportunity to make modifications to pass inspection prior to the beginning of the water rocket launching competition.

3. An overall winner will be judged, upon the following criteria (based on 100%):
 - >Hang Time of Rocket **70%**
 - >Patch Design **30%**
4. The rocket will be launched at an angle of approximately a **90 degree** using **355 ml (milliliters)** of water and 60 psi of air pressure. The “hang time” of the rocket will be measured using a stopwatch.
5. The “hang time” is defined as the time from the point when the **rocket leaves the launch pad until the time it reaches the ground.** This measurement will be recorded by at least three qualified judges, with the average “hang time” used to determine the final score.
6. The final score for hang time will be calculated based on the greatest single hang time recorded during the competition, using the following formula:

$$\frac{\text{average hang time (sec)}}{\text{maximum hang time (sec)}} \times 100$$

Construction and Operation Requirements continued:

1. The pressure vessel must be ONE (1) clear plastic, 2-liter bottle (i.e., no colored bottles allowed).
2. Water and air pressure will be the sole source of propellant. At check-in, the water volume (**355ml**) will be measured and placed in the rocket fuel chamber.
3. **Metal, glass, or spikes cannot be used to construct the rocket. Use of these materials will automatically disqualify the team from the competition.**
4. On the bottom of the rocket, 7.5 cm from the throat of the exit plane must be clear of any coverage (paint, markings, drawings, etc.). See Diagram 2.
5. The maximum allowed total height of the rocket is 76.0 cm. See Diagram 2.
6. The nose-cone tip must have a minimum radius of 1.5 cm. See Diagram 3.
7. The fins must start 10 cm from the throat of the exit plane. See Diagram 2.
Note: No forward-swept type of fins are allowed to be used on the rocket.
8. The maximum fin-width distance from the bottle is 10.0 cm (or 16.5 cm from the center of the bottle axis), see Diagram 4.
9. The use of parachutes is NOT allowed.

PATCH DESIGN CRITERIA:

1. Patch designs must be submitted on a 13" x 13" poster board.
2. All entries must contain the team name, crew members' names, and follow the theme of this year's SECME competition: "*SECME: Vehicle of the Future - Engineered for Success*"
3. Patches must be hand-made original work prepared and submitted by the SECME School Team who will be participating in the Water-Rocket Design Competition. Ink pencils, markers, or paint may be used.
4. Participating teams must be prepared to display their patches prior to the launch of their rockets.
5. Each entry is to be submitted by the mission captain along with the rocket at the time of check-in. A patch should be clipped to the outside of the bag containing the rocket.

Diagram 2

Rocket Identification

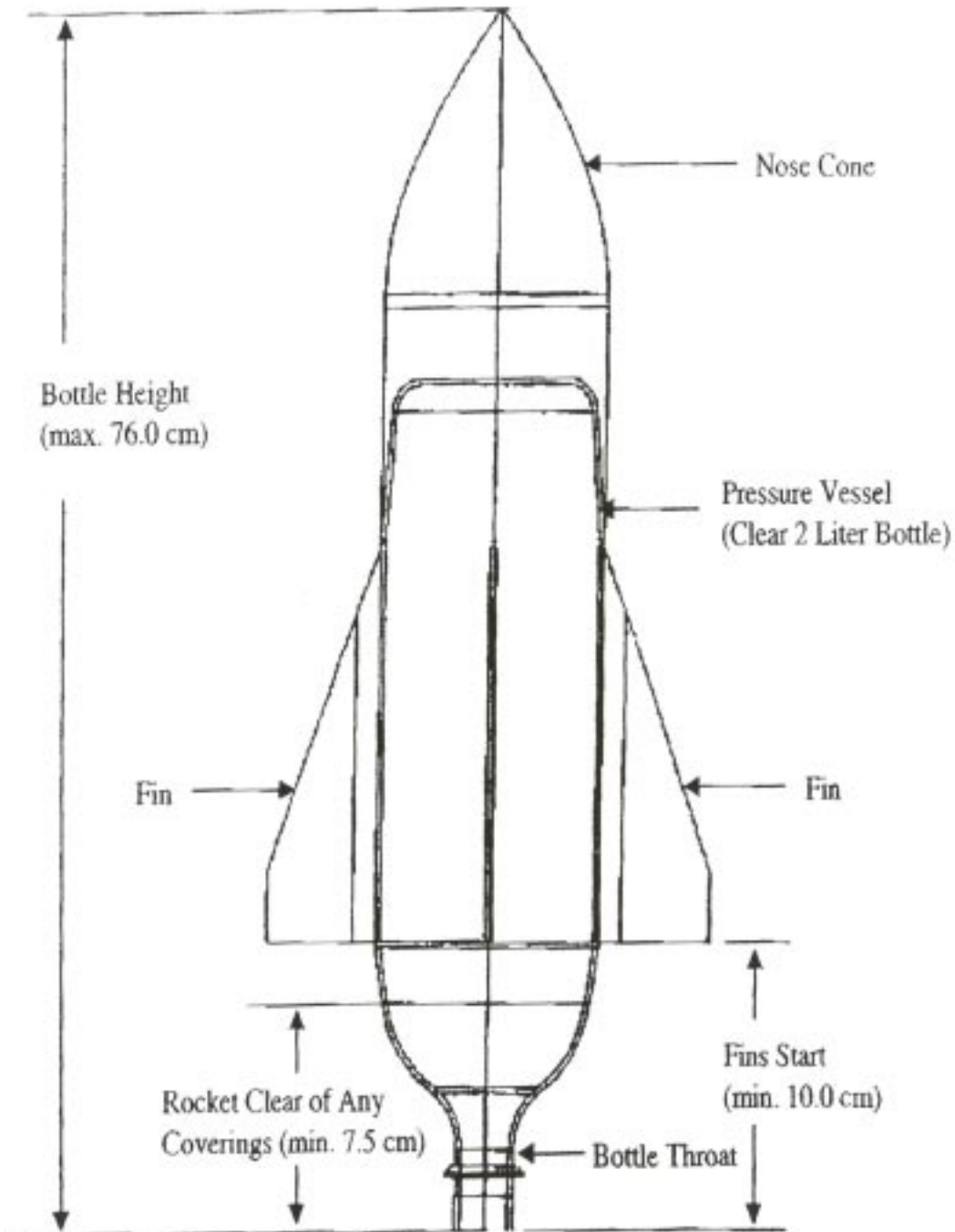


Diagram 3

Nose Cone Diagram

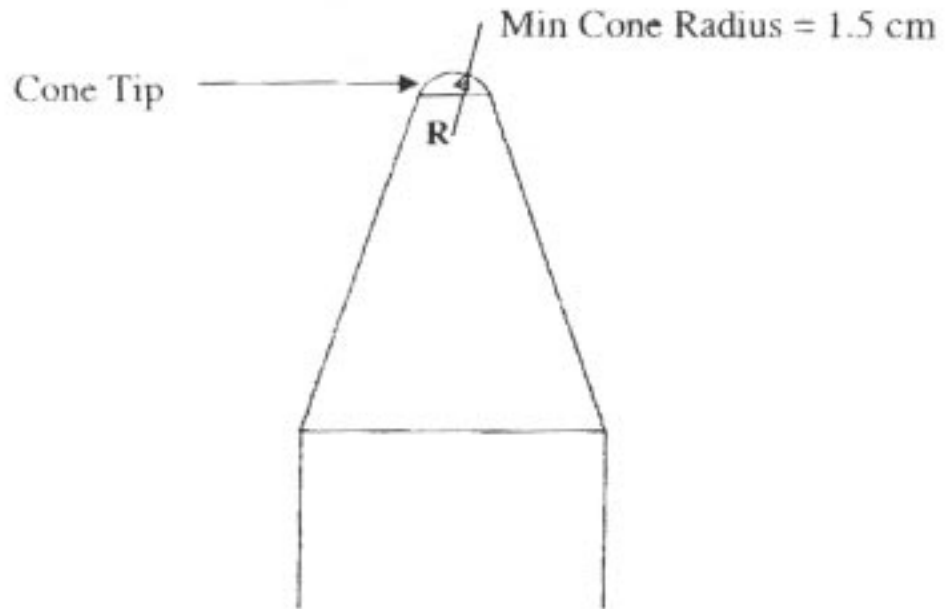


Diagram 4

Fin Diagram

