

Model Hydrogen Fuel Cell Car Race Competition Rules

Race Components

There are three components to the model fuel cell car race and teams will be judged on all three components. Trophies are awarded in each category. There is not an overall trophy combining the three elements.

1. Speed race: Each car will have three time speed races. The top three fastest cars after ALL of the timed trails are complete will compete in the final “head-to-head” race to determine first, second, and third places.

2. Engineering Design: A panel of Fuel Cell Engineers will evaluate the working design of the fuel cell car. Hydrogen storage, hydrogen delivery, gearing, etc. will be judged in this category. Judges will interview each team and ask design questions to assess the ability of the team to answer technical questions about their car. Adult interpreters may be present to help questions with language issues.

3. Artistic Design: Cars will be judged by attendees of the Fuel Cell Seminar based on the overall appearance and aesthetic design of the car.

NOTE: All cars must be designed and built by the students with limited assistance from the coach or other adults. **This is a student competition!**

Materials

Student teams will be provided an H-tec fuel cell, motor, battery pack, tubing, gears, wheels, axles, hydrogen and oxygen gas collection systems and electrical connection wires on August 15, 2007. Students must use the unaltered H-tec fuel cell and motor that are provided in the fuel cell kit to provide the energy and movement of the model car. The other components are included as a courtesy, but are not required. The rest of the car design and components will be up to the creativity and ingenuity of the students.

Vehicle Specifications

The vehicle must be safe to contestants and spectators, e.g., no sharp edges, Projectiles, etc. Teams will be asked to use the 2 hour time allotment on Sunday to repair any elements judged to be unsafe by the competition advisory committee.

Size: Vehicles will be displayed Sunday evening through Wednesday in the Fuel

Exhibit Hall. Each vehicle will be enclosed in a clear plastic cube with dimensions of 9 inches wide, 9 inches long and 9 inches high. Any vehicle not able to fit into the cube, will be disqualified from competition.

Energy Source: The electricity needed for the electrolysis procedure will be provided by a solar panel or the battery pack that was included in fuel cell kit. Solar Panels and battery packs will be available in San Anonio. The electrolysis will be completed in a designated charging area prior to the start of the race. The only energy source permitted on the vehicle is the fuel cell with the hydrogen that was produced from the electrolysis procedure.

Steering: A guide wire attachment may be attached to the car.

A guide wire, no more than 1.5 cm. from the surface of the track will be available on each track. Teams may elect to use the guide wire or not to use the guide wire. If the guide wire is not to be used, it will be removed from the track before the start of each race. If a team chooses to use the guide wire, the vehicle must be easily removed from the guide wire, without disconnecting the guide wire. Students might also choose to add steering to the car such that cars hitting the rails on the side of the track will be guided along the rail or back to the middle of the track. No radio control or other external steering is permitted in the cars.

Track Specifications:

The length of the race course is 10 meters over flat terrain.

Race lanes are at least 60 cm. wide.

The guide wire will be located in the center of the track and will not be more than $\frac{1}{2}$ inch above the track surface. Students are not required to use the guide wire, but may choose to do so.

The track will be a black neoprene rubber material. This surface is very smooth and slick.

Wooden side rails will align the left and right sides of the track. The rails will be $\frac{3}{4}$ inch high to prevent cars from leaving the track. Cars are permitted to make contact with the side rails.

Race Conduct

Charging Station: A solar panel and battery pack will be provided to supply the electricity needed for the electrolysis procedure. Distilled water will be provided at the charging station for the electrolysis process. Teams will have a minimum of 10 minutes between races to produce hydrogen. Students may use methods other than the reversible fuel cell provided for hydrogen production.

The only energy source permitted on the vehicle is the fuel cell provided with hydrogen as the fuel.

Repair Station: There will be a repair table set up separate from the recharging area to

help facilitate quick repairs to the cars. Teams that are scheduled to race in the next heat will be given priority in the repair area. There will be a 10 minute time limit for repairs.

Race Time: At race time, the vehicle will be placed behind the starting line with at least the front wheels in contact with the ground. One team member must be at the starting line and one team member must be at the finish line at the start of the race.

An early start or push start may result in disqualification or a re-run of the heat. The determination will be left to the race judges.

All vehicles will be started when the official signal is given. Each car will have three timed speed trials. The fastest individual time for each car will determine the final placement of teams. The top 3 fastest cars after all of the timed trials are complete will compete in the final "head-to-head" race for first, second, and third place.

The judges will note the official time on the Official Race Time Poster. If the car does not finish the race, it will be noted as a Did Not Finish (DNF) on the Poster.

Team members may not accompany or touch the vehicle on the track.
Vehicles stalled on the track may be retrieved after the end of the race has been declared by the Lead Judge.

Challenges must be made before the race judges begin the next heat. All challenges must come from the team members who are actively competing and directed to the lead judge. The decisions of the race judges are final.
Judges may inspect cars prior to the final heat or at anytime during/after heats.

Car Competition Awards

Prizes will be awarded in Three Categories:

Fastest Car – First, Second, and Third places will be awarded. The three cars with the fastest times in the preliminary races will compete head-to-head in the final race. Places will be awarded based on finishes in the final race regardless of previous times in the preliminary races.

Engineering Award – First, Second, and Third places will be awarded in engineering design. Team members will be interviewed by a panel of 3 engineering judges. The decision of the engineering judges will be final. Judges will be inquiring into the design of the car including, steering, hydrogen storage, gear ratio, body construction and other engineering design features.

Artistic Award – First, Second, and Third places will be awarded to the cars with the best artistic design. The artistic theme of the car competition is “My Home Country” This award will be judged by attendees of the Fuel Cell Seminar who will view the cars on display and complete voting forms in the Exhibition Hall. The categories on the voting cards will include – use of color, adherence to theme, and overall appearance.