



## 2024 SOLAR BOAT COMPETITION RULES

May 18, 2024

Riley Lake,  
Eden Prairie, Minnesota

### OBJECTIVE

Students (solar boat teams) will research, design and build a solar powered boat that is responsive to concerns of design, function, and the environment. Each team will work under the mentorship of an educator or renewable energy professional and culminate their experience as a boat race team at the 32<sup>nd</sup> annual Minnesota Renewable energy Society Solar Boat Competition.

### SOLAR POWERED BOAT DEFINITION

A solar powered boat makes direct use of the sun's radiation. The solar energy must be received exclusively by on board transducers (i.e. photovoltaic cells). On board storage and conversion into intermediate forms of energy (i.e. electric energy storage in batteries) are permitted. The boats must not be designed to use forms of energy other than solar (no wind, no human, no gas engine, no additional onshore batteries or PV cells, etc.).

Participants may either custom build a boat from scratch or modify an existing boat to produce a solar powered boat. The boats are to be no longer than 20 ft and no wider than 8 ft to allow for legal trailer towing. The solar boat may use one 12-volt solar panel, 110 watts, and one 12-volt sealed/low maintenance battery, and one 12-volt motor.

### REGATTA CLASSES

There are three (3) classes in which participants can race: one student class; one adult class; and one experimental/exhibition class. The student and adult classes are defined as a hull that is pre-made, modified, and/or specially designed. The experimental/exhibition class is for creative designs that exceed the limits of the boat, number of panels, and/or number of batteries.

**Student Class** – grades 7 thru 12 inclusive

**Adult Class** – groups or individuals not associated with a school

**Experimental/Exhibition Class** – exceeds the criteria listed

Entrants may enroll in any class that they choose, but must remain in their class of choice. Entrants must designate their class on their registration form. MRES and the Judges reserve the right to reassign boats in accordance with the classes listed.

A minimum of one person must be on board each boat during all portions of the race (i.e. no remote controlled boats).

### PV PANEL SPECIFICS

The photovoltaic panel shall be one 110 watt, 12 volt panel.

Any solar panel whose label appears to have been modified will be disqualified and must be removed from the boat prior to the start of the race.

## **BATTERY SPECIFICS**

Battery rules for the Student and Adult classes are:

One 12 volt, sealed or low maintenance, lead acid, marine battery, with 70-85 amps hours of power.

Battery rules for Experimental/Exhibition Class are open.

All batteries must be lead acid and must be group 24. Group 24 batteries are the most common size automotive and marine battery sold in the United States. Group 24 batteries have the following maximum dimensions: 11" long x 6" wide x 9 5/8" high (including posts). Group 24 batteries weigh about 47 pounds. Battery must be installed in vented, covered, secure battery box

No shore charging of batteries will be permitted either by PV array, portable generator, or any other means.

No swapping of batteries (depleted batteries for charged batteries) will be allowed.

## **MOTOR SPECIFICS**

One 12-volt motor of your choice.

## **BOAT SAFETY**

MRES will perform a full safety inspection on each boat just prior to the actual race. All boats must pass the safety inspection in order to be allowed to race. A list of items that are required is attached.

All boats must be unsinkable – able to remain afloat with all equipment and the driver on board. Flootation may be accomplished with an air bladder, foam or other manufactures suggested method.

All boat drivers, navigators or alternate drivers must be able to tread water for at least 1 minute and easily swim a total distance of 70 meters. Life jackets are required for all participants.

## **MINNESOTA BOATING REGULATIONS**

All race registered solar boats must comply with Minnesota boating regulations including registration. MN has boat license exemption for one day special events. Depending upon the lake.

## **INSURANCE**

Each team (or school) must provide MRES with two items: A Release and Waiver of Liability from each student and/or participant (including advisors); and a school insurance event binder listing MRES as an "also insured" for the day of the event. Lack of insurance or individual waivers will prevent participation in the event.

## **ADDITIONAL COMPONENT OPPORTUNITIES**

### Opportunity #1

Students will prepare a public web page with text, pictures, and plans that describe the design and construction of the boat, including the specifics of the boat (length, width, height, displacement, etc.) The web page shall remain public for one year.

There are extra points available for proof that students have generated print/media coverage of the solar boat race.

In order to be considered for this component, the link to the webpage shall be submitted to MRES prior to the race.

### **The top 3 best designs will be featured on the Solar Boat Regatta website.**

*Please note: The web page component is not required for a school to participate in the solar boat race, but it is highly recommended. This component helps students keep written documentation of their boat from inception to completed project.*

### Opportunity #2

There will be an additional trophy for the most creative design – based on judges’ decision.

## **DESCRIPTION BOARDS**

If a website is not created, the team shall prepare a foam poster board with text, pictures, and plans that describe the design and construction of the boat. The poster board must be displayed at each boat’s “pier site.” Minimum poster board size is 2’ x 3’. The school name and student names are to be clearly displayed on the board with the specifics of the boat (L, W, H, displacement, etc.).

If a website is created, the team shall print those pages and affixed to a poster board, of the same dimensions listed above, and this shall be displayed at the “pier site”.

## **JUDGING**

A team of judges from various backgrounds will evaluate each boat according to the attached 2 page form.

## **RACES**

Slalom Race – Upon check-in, boats will prove maneuverability by maneuvering through a specified obstacle course defined by a series of buoys without striking any buoys or taking on water. This is an individual competition. Fastest boat through the course is the winner.

Speed Race – race from dead stop over a measured distance. Boats will compete in tandem. For each heat, the boat to cross the finish line in the shortest time wins that heat. The boats with the top six fastest times will compete following the endurance race to determine the ultimate winner of the speed races.

One Hour Endurance Race – boats will proceed along a specific route, making as many laps in one hour as they can. Judges will independently record each passing by each boat. During the Endurance Race, all teams must beach every 15 minutes; therefore, we recommend switching drivers at that point. This encourages participation throughout the team. The boat with the most laps completed within the one-hour race is the winner.

## **COLLISIONS**

Collisions between boats will result in penalties to all boats involved in the collision. Use the Coast Guard “Rules of the Road” as a guide for proper seamanship. Try to review these with your students before race day.

**AWARDS**

Trophies will be awarded to the best boat in each class, as well as the runner ups in each class.

**FEES**

Registration Fee (per boat):

Received on or before April 7, 2024	\$55.00
Received between April 8, 2024 and May 3, 2024	\$70.00
Applications received after May 4, 2024 will be and be accepted at the discretion of the MRES	\$90.00

**Boat License:** MN has an exemption for one day special events.

**VOLUNTEERS**

The entrant/team for each boat entered will also commit to providing one volunteer to MRES on Race Day. That volunteer may be required to help time races, count laps during the endurance race, and/or other duties as assigned by MRES staff.

**PHOTO/VIDEO RELEASE**

Participants realize and release the rights to photo and video recording taken by the Minnesota Renewable Energy Society, its members, and volunteers. Photo/video recording may be used in future educational programs and outreach and/or utilized on the web site.

Possible Solar Panel

<https://www.northerntool.com/products/nature-power-solar-panel-power-kit-110-watts-model-53110-88432>