



SUMMER FAYRE

Sunday 8th July 2012



The Summer Fayre Planning Committee, The RSM Centre, North Street, Rotherfield, East Sussex, TN6 3LX

WATER ROCKET CHALLENGE DETAILED RULES

Safety is very important with any rocket. Water Rockets are not toys. A pressurized water rocket can store huge amounts of energy and fly hundreds of miles per hour. They can suddenly burst, or injure bystanders by landing hundreds of feet away. Rockets can be safe but only when everyone understands and abides by safe behaviour.

A 'Water Rocket' is defined as any rocket whose thrust is generated from low temperature compressed gas (air) acting on an inert reaction mass (water).

1. Entries

- 1.1. This competition is open to all ages. Children under 16 years of age may enter individually or as a team, but they must have adult supervision.
- 1.2. Each entry is for one rocket. A team may enter multiple rockets, but each rocket submitted for the competition must be entered individually.
- 1.3. Each rocket entered is permitted up to three attempts at launch.
- 1.4. Each Rocket must be scrutinised by the range marshal as "Safe To Fly" before launch. Entries which are not safe to fly will not be permitted to launch.

2. Construction Materials:

- 2.1. The rocket pressure vessel should be constructed from a plastic drinks bottle suitable for storing carbonated drinks, capable of withstanding a pressure greater than 80psi.
- 2.2. The rocket nozzle should have an internal diameter of ~22mm which is the standard size of most fizzy drink bottles.
- 2.3. The nose, body and fins should be constructed of lightweight, non-metallic parts so that the rocket does not conduct electricity.
- 2.4. Glass may not be used in construction.
- 2.5. Metallic components should never be in contact with the outside of the pressure vessel as they could become dangerous projectiles should the rocket explode.
- 2.6. Rockets can be any shape or size, but the total dry weight of all flying components in a flight ready condition cannot exceed 1,500 grams.
- 2.7. No explosive or bio-hazardous materials are to be used in the construction.
- 2.8. Live animals may not be carried.

3. Recovery System:

- 3.1. Fast falling rockets, debris, or rocket parts can be very dangerous. Therefore all launched parts of rocket which travel over 6 meters (20 feet) in altitude must have a recovery system which limits their descent rate at time of touchdown at ground level to a

- maximum velocity of 10 meters/second (33 feet/second). This includes all pieces which separate in flight.
- 3.2. Recovery system cannot contain black powder, fireworks, or pyrotechnic "squibs".
 - 3.3. Recovery system malfunctions for flight distances greater than 6 metres will result in that flight being disallowed.
4. Fuel/Reaction Mass Rules:
 - 4.1. Reaction Mass must be ordinary drinkable tap water without additives.
 5. Launcher:
 - 5.1. Teams may use the launcher provided, or construct their own.
 - 5.2. Teams wishing to use the provided launcher should ensure that their rockets fit the launcher before the event.
 - 5.3. Rockets should be launched from a stable launch device that is pointed to within 30 degrees of the vertical to ensure that the rocket flies nearly straight up.
 - 5.4. Launchers should be constructed using components which are suitable for the planned launch pressure of 30psi.
 - 5.5. The launch system should include a pressure gauge calibrated in pounds per square inch (psi)
 - 5.6. Launchers must include a mechanism allowing the flight crew to initiate launch from a safe distance of at least 5 metres.
 - 5.7. Launcher must include a method for depressurising the rocket remotely in the event of launch failure.
 6. Safe Distance:
 - 6.1. Everyone should be kept at a safe distance from any pressurized rocket. The safe distance for flight crew is 5 meters.
 - 6.2. The safe distance for spectators should be 10 meters or more. Spectators should always stay behind flight crew members.
 7. Pressure Source:
 - 7.1. All valves, hoses, pipes and fittings from the pressure source to the launch pad must be suitable for the planned launch pressure.
 - 7.2. Pressurisation must be from bicycle pump or car foot pump only. Compressors or bottled air pressure sources are not permitted.
 - 7.3. Rockets must be pressurized using atmospheric air only. Other gasses, "Phase change" (steam rockets) and pyrotechnic pressurizations systems are not allowed.
 - 7.4. Rockets may be pressurised up to 40psi prior to launch and allowed to leak down to 30psi for launch. Rockets must not be launched at pressures above 30psi and must never be pressurised above 80psi in this competition.
 - 7.5. Pumping must stop once the launch countdown has begun.
 - 7.6. An abort may be called at any time during the pressurisation or up to t-minus 5 seconds, either by the launch crew, the judges or the safety marshals. Calling an abort does not jeopardise the launch attempt, although repeated aborts due to system faults may invalidate a launch attempt at the judges' discretion.
 8. Launching:
 - 8.1. Rockets should only be launched outdoors, in a clear open area with no obstacles such as trees or power lines.
 - 8.2. Rockets must not be launched over or near roadways or into the path of a vehicle.
 - 8.3. Rockets must not be launched where there are people or animals in the landing area.

- 8.4. Rockets should be launched in safe weather conditions with wind speeds no greater than 15 miles per hour. The safety marshals may call a launch hold in adverse conditions.
 - 8.5. An audible countdown should be used before each launch.
 - 8.6. The launch crew are to stand back a minimum of 5 meters while rocket is pressurized and launched.
 - 8.7. Touching or handling the pressurised rocket is forbidden. Rockets must be remotely launched.
 - 8.8. If a rocket fails to launch when triggered, it must be depressurized before anyone approaches. In the event the depressurization fails the safety officer may attempt either a manual launch or depressurisation at his discretion. The launch attempt is recorded as a launch failure.
9. Recovery:
- 9.1. Do not attempt to recover any rocket from power lines, tall trees, rooftops or other dangerous places.
 - 9.2. Rockets which become snagged or lost during the competition forfeit any remaining attempts.
 - 9.3. Rockets which launch and land safely may be recovered by members of the launch crew or the safety marshals.
 - 9.4. Spectators should not recover any rockets.
10. Judging:
- 10.1. Rockets will be scored on Altitude achieved, Horizontal flight distance from launch point, Visual Appearance and Technical features.
11. Alterations:
- 11.1. The organisers reserve the right to vary these rules as required to ensure the event runs safely, fairly and enjoyably.
 - 11.2. Every effort will be made to inform teams of changes which might influence their design before the event.