



Model Rocket Safety

Since the late 1950's, over 25,000 schools in the United States have used model rockets for educational purposes. Although model rocketry is relatively safe compared with other hobbies, burn injuries have occurred when the equipment is not used in accordance with safety regulations. From 1975 to 1992, the Consumer Product Safety Commission reported 18 burn injuries that were caused by rocket engines being used improperly.¹ What follows are general safety guidelines and best practices that should be followed when operating model rocketry equipment.

- Provide written documentation to the local fire department indicating the date, time, and location of the rocket launch(es) and request approval of the activity ahead of time. This written documentation should also include:
 - Whether the launch event will be overseen by a licensed pyrotechnician.
 - Confirmation that (a) each relevant local and state health and safety codes, (b) National Fire Protection Association (NFPA) codes 1122 and 1127, and (c) all safety regulations and best practices developed by the National Association of Rocketry (NAR), will be followed.
- Carefully read all assembly and launch instructions before using the rocket.
- Ensure that a chemical fire extinguisher and a water bucket (of at least five gallons) are located near the launch location and that all participants are aware of their location.
- Do not mix or load any chemicals or other materials with the purchased model rocket set or rocket engine.
- Ensure that the launch pad is located at least 250 ft. from the nearest perimeter fencing, and at least 300 ft. from nearby homes or other non-school facilities.
- Do not launch rockets during severe weather or when wind speed exceeds 10 mph.
- Create a visible "spectator line" at least 50 ft. from the launch pad.
- Determine the primary direction of wind movement and ensure that the spectator line is parallel with that direction.



1. [Lynch](#), [Bellian](#), [Edlich](#), and [Himel](#), "Model Rocket Engine Burn Injuries: The Need for Stricter Regulation," *The Journal of Emergency Medicine*, 1994 May-Jun; 12(3): 325-30.



- Do not use rockets that exceed heights of 500 ft. Above Ground Level (AGL) or whose motors exceed 5 Newton Seconds (N-Sec). (Consult the manufacturer's specifications included with the rocket set to ensure that these conditions are met.)
- Fully submerge used rocket engines in the water bucket before disposing them.
- It is recommended that NAR safety code be followed as much as possible at all times during the activity. (A portion of the NAR code is located below.)

NAR Model Rocket Safety Code

- **Materials.** I will use only lightweight, non-metal parts for the nose, body, and fins of my rocket.
- **Motors.** I will use only certified, commercially-made model rocket motors, and will not tamper with these motors or use them for any purposes except those recommended by the manufacturer.
- **Ignition System.** I will launch my rockets with an electrical launch system and electrical motor igniters. My launch system will have a safety interlock in series with the launch switch, and will use a launch switch that returns to the "off" position when released.
- **Misfires.** If my rocket does not launch when I press the button of my electrical launch system, I will remove the launcher's safety interlock or disconnect its battery, and will wait 60 seconds after the last launch attempt before allowing anyone to approach the rocket.
- **Launch Safety.** I will use a countdown before launch, and will ensure that everyone is paying attention and is a safe distance of at least 15 feet away when I launch rockets with D motors or smaller, and 30 feet when I launch larger rockets. If I am uncertain about the safety or stability of an untested rocket, I will check the stability before flight and will fly it only after warning spectators and clearing them away to a safe distance.
- **Launcher.** I will launch my rocket from a launch rod, tower, or rail that is pointed to within 30 degrees of the vertical to ensure that the rocket flies nearly straight up, and I will use a blast deflector to prevent the motor's exhaust from hitting the ground. To prevent accidental eye injury, I will place launchers so that the end of the launch rod is above eye level or will cap the end of the rod when it is not in use.
- **Size.** My model rocket will not weigh more than 1,500 grams (53 ounces) at liftoff and will not contain more than 125 grams (4.4 ounces) of propellant or 320 N-sec (71.9 pound-seconds) of total impulse. If my model rocket weighs more than one pound (453 grams) at liftoff or has more than four ounces (113 grams) of propellant, I will check and comply with Federal Aviation Administration regulations before flying.
- **Flight Safety.** I will not launch my rocket at targets, into clouds, or near airplanes, and will not put any flammable or explosive payload in my rocket.
- **Recovery System.** I will use a recovery system such as a streamer or parachute in my rocket so that it returns safely and undamaged and can be flown again, and I will use only flame-resistant or fireproof recovery system wadding in my rocket.
- **Recovery Safety.** I will not attempt to recover my rocket from power lines, tall trees, or other dangerous places.

Please also visit the official NAR website at www.nar.org for further safety updates on model rocketry.

This Alliant Risk Control Consulting fact sheet is not intended to be exhaustive. The discussion and best practices suggested herein should not be regarded as legal advice. Readers should pursue legal counsel or contact their insurance providers to gain more exhaustive advice.

For more information on this topic, please contact Alliant Risk Control Consulting at (949) 260-5042 or riskcontrol@alliant.com