

APPENDIX II: FAA REGULATIONS

14 CFR, SUBCHAPTER F, PART 101, SUBPART C – AMATEUR ROCKETS

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Subpart C— Amateur Rockets

§ 101.21 Applicability.

(a) This subpart applies to operating unmanned rockets. However, a person operating an unmanned rocket within a restricted area must comply with §101.25(b)(7)(ii) and with any additional limitations imposed by the using or controlling agency.

(b) A person operating an unmanned rocket other than an amateur rocket as defined in §1.1 of this chapter must comply with 14 CFR Chapter III.

[Doc. No. FAA–2007–27390, 73 FR 73781, Dec. 4, 2008]

§ 101.22 Definitions.

The following definitions apply to this subpart:

(a) *Class 1—Model Rocket* means an amateur rocket that:

- (1) Uses no more than 125 grams (4.4 ounces) of propellant;
- (2) Uses a slow-burning propellant;
- (3) Is made of paper, wood, or breakable plastic;
- (4) Contains no substantial metal parts; and
- (5) Weighs no more than 1,500 grams (53 ounces), including the propellant.

(b) *Class 2—High-Power Rocket* means an amateur rocket other than a model rocket that is propelled by a motor or motors having a combined total impulse of 40,960 Newton-seconds (9,208 pound-seconds) or less.

(c) *Class 3—Advanced High-Power Rocket* means an amateur rocket other than a model rocket or high-power rocket.

[Doc. No. FAA–2007–27390, 73 FR 73781, Dec. 4, 2008]

§ 101.23 General operating limitations.

(a) You must operate an amateur rocket in such a manner that it:

- (1) Is launched on a suborbital trajectory;
- (2) When launched, must not cross into the territory of a foreign country unless an agreement is in place between the United States and the country of concern;
- (3) Is unmanned; and
- (4) Does not create a hazard to persons, property, or other aircraft.

(b) The FAA may specify additional operating limitations necessary to ensure that air traffic is not adversely affected, and public safety is not jeopardized.

[Doc. No. FAA–2007–27390, 73 FR 73781, Dec. 4, 2008]

§ 101.25 Operating limitations for Class 2-High Power Rockets and Class 3-Advanced High Power Rockets.

When operating *Class 2-High Power Rockets* or *Class 3-Advanced High Power Rockets*, you must comply with the General Operating Limitations of §101.23. In addition, you must not operate *Class 2-High Power Rockets* or *Class 3-Advanced High Power Rockets*—

- (a) At any altitude where clouds or obscuring phenomena of more than five-tenths coverage prevails;
- (b) At any altitude where the horizontal visibility is less than five miles;
- (c) Into any cloud;
- (d) Between sunset and sunrise without prior authorization from the FAA;
- (e) Within 9.26 kilometers (5 nautical miles) of any airport boundary without prior authorization from the FAA;
- (f) In controlled airspace without prior authorization from the FAA;
- (g) Unless you observe the greater of the following separation distances from any person or property that is not associated with the operations:
 - (1) Not less than one-quarter the maximum expected altitude;
 - (2) 457 meters (1,500 ft.);
- (h) Unless a person at least eighteen years old is present, is charged with ensuring the safety of the operation, and has final approval authority for initiating high-power rocket flight; and
- (i) Unless reasonable precautions are provided to report and control a fire caused by rocket activities.

[74 FR 38092, July 31, 2009, as amended by Amdt. 101–8, 74 FR 47435, Sept. 16, 2009]

§ 101.27 ATC notification for all launches.

No person may operate an unmanned rocket other than a Class 1—Model Rocket unless that person gives the following information to the FAA ATC facility nearest to the place of intended operation no less than 24 hours before and no more than three days before beginning the operation:

- (a) The name and address of the operator; except when there are multiple participants at a single event, the name and address of the person so designated as the event launch coordinator, whose duties include coordination of the required launch data estimates and coordinating the launch event;
- (b) Date and time the activity will begin;
- (c) Radius of the affected area on the ground in nautical miles;
- (d) Location of the center of the affected area in latitude and longitude coordinates;
- (e) Highest affected altitude;
- (f) Duration of the activity;
- (g) Any other pertinent information requested by the ATC facility.

[Doc. No. FAA–2007–27390, 73 FR 73781, Dec. 4, 2008, as amended at Doc. No. FAA–2007–27390, 74 FR 31843, July 6, 2009]

§ 101.29 Information requirements.

(a) *Class 2—High-Power Rockets*. When a Class 2—High-Power Rocket requires a certificate of waiver or authorization, the person planning the operation must provide the information below

on each type of rocket to the FAA at least 45 days before the proposed operation. The FAA may request additional information if necessary to ensure the proposed operations can be safely conducted. The information shall include for each type of Class 2 rocket expected to be flown:

- (1) Estimated number of rockets,
- (2) Type of propulsion (liquid or solid), fuel(s) and oxidizer(s),
- (3) Description of the launcher(s) planned to be used, including any airborne platform(s),
- (4) Description of recovery system,
- (5) Highest altitude, above ground level, expected to be reached,
- (6) Launch site latitude, longitude, and elevation, and
- (7) Any additional safety procedures that will be followed.

(b) *Class 3—Advanced High-Power Rockets*. When a Class 3—Advanced High-Power Rocket requires a certificate of waiver or authorization the person planning the operation must provide the information below for each type of rocket to the FAA at least 45 days before the proposed operation. The FAA may request additional information if necessary to ensure the proposed operations can be safely conducted. The information shall include for each type of Class 3 rocket expected to be flown:

- (1) The information requirements of paragraph (a) of this section,
- (2) Maximum possible range,
- (3) The dynamic stability characteristics for the entire flight profile,
- (4) A description of all major rocket systems, including structural, pneumatic, propellant, propulsion, ignition, electrical, avionics, recovery, wind-weighting, flight control, and tracking,
- (5) A description of other support equipment necessary for a safe operation,
- (6) The planned flight profile and sequence of events,
- (7) All nominal impact areas, including those for any spent motors and other discarded hardware, within three standard deviations of the mean impact point,
- (8) Launch commit criteria,
- (9) Countdown procedures, and
- (10) Mishap procedures.

[Doc. No. FAA–2007–27390, 73 FR 73781, Dec. 4, 2008, as amended at Doc. No. FAA–2007–27390, 74 FR 31843, July 6, 2009]

APPENDIX III – HIGH POWER ROCKET SAFETY CODE

NFPA 1127 “Code for High Power Rocket Motors”

[<http://www.nar.org/NARhpsc.html>]

1. **Certification.** I will only fly high power rockets or possess high power rocket motors that are within the scope of my user certification and required licensing.
2. **Materials.** I will use only lightweight materials such as paper, wood, rubber, plastic, fiberglass, or when necessary ductile metal, for the construction of my rocket.
3. **Motors.** I will use only certified, commercially made rocket motors, and will not tamper with these motors or use them for any purposes except those recommended by the manufacturer. I will not allow smoking, open flames, nor heat sources within 25 feet of these motors.
4. **Ignition System.** I will launch my rockets with an electrical launch system, and with electrical motor igniters that are installed in the motor only after my rocket is at the launch pad or in a designated prepping area. My launch system will have a safety interlock that is in series with the launch switch that is not installed until my rocket is ready for launch, and will use a launch switch that returns to the "off" position when released. If my rocket has onboard ignition systems for motors or recovery devices, these will have safety interlocks that interrupt the current path until the rocket is at the launch pad.
5. **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.
6. **Launch Safety.** I will use a 5-second countdown before launch. I will ensure that no person is closer to the launch pad than allowed by the accompanying Minimum Distance Table, and that a means is available to warn participants and spectators in the event of a problem. I will check the stability of my rocket before flight and will not fly it if it cannot be determined to be stable.
7. **Launcher.** I will launch my rocket from a stable device that provides rigid guidance until the rocket has attained a speed that ensures a stable flight, and that is pointed to within 20 degrees of vertical. If the wind speed exceeds 5 miles per hour I will use a launcher length that permits the rocket to attain a safe velocity before separation from the launcher. I will use a blast deflector to prevent the motor's exhaust from hitting the ground. I will ensure that dry grass is cleared around each launch pad in accordance with the accompanying Minimum Distance table, and will increase this distance by a factor of 1.5 if the rocket motor being launched uses titanium sponge in the propellant.

8. **Size.** My rocket will not contain any combination of motors that total more than 40,960 N-sec (9208 pound-seconds) of total impulse. My rocket will not weigh more at liftoff than one-third of the certified average thrust of the high power rocket motor(s) intended to be ignited at launch.

9. **Flight Safety.** I will not launch my rocket at targets, into clouds, near airplanes, nor on trajectories that take it directly over the heads of spectators or beyond the boundaries of the launch site, and will not put any flammable or explosive payload in my rocket. I will not launch my rockets if wind speeds exceed 20 miles per hour. I will comply with Federal Aviation Administration airspace regulations when flying, and will ensure that my rocket will not exceed any applicable altitude limit in effect at that launch site.

10. **Launch Site.** I will launch my rocket outdoors, in an open area where trees, power lines, buildings, and persons not involved in the launch do not present a hazard, and that is at least as large on its smallest dimension as one-half of the maximum altitude to which rockets are allowed to be flown at that site or 1500 feet, whichever is greater.

11. **Launcher Location.** My launcher will be 1500 feet from any inhabited building or from any public highway on which traffic flow exceeds 10 vehicles per hour, not including traffic flow related to the launch. It will also be no closer than the appropriate Minimum Personnel Distance from the accompanying table from any boundary of the launch site.

12. **Recovery System.** I will use a recovery system such as a parachute in my rocket so that all parts of my rocket return safely and undamaged and can be flown again, and I will use only flame-resistant or fireproof recovery system wadding in my rocket.

13. **Recovery Safety.** I will not attempt to recover my rocket from power lines, tall trees, or other dangerous places, fly it under conditions where it is likely to recover in spectator areas or outside the launch site, nor attempt to catch it as it approaches the ground.

Installed Total Impulse (Newton-Seconds)	Equivalent High Power Motor Type	Minimum Diameter of Cleared Area (ft.)	Minimum Personnel Distance (ft.)	Minimum Personnel Distance (Complex Rocket) (ft.)
0 -- 320.00	H or smaller	50	100	200
320.01 -- 640.00	I	50	100	200
640.01 -- 1,280.00	J	50	100	200
1,280.01 -- 2,560.00	K	75	200	300
2,560.01 -- 5,120.00	L	100	300	500
5,120.01 -- 10,240.00	M	125	500	1000
10,240.01 -- 20,480.00	N	125	1000	1500
20,480.01 -- 40,960.00	O	125	1500	2000

*** Note: A Complex rocket is one that is multi-staged or that is propelled by two or more rocket motors**

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