

NFPA 1127  
Code for  
High Power  
Rocketry  
1998 Edition

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## NFPA 1127

Code for

# High Power Rocketry

1998 Edition

This edition of NFPA 1127, *Code for High Power Rocketry*, was prepared by the Technical Committee on Pyrotechnics and acted on by the National Fire Protection Association, Inc., at its Annual Meeting held May 18–21, 1998, in Cincinnati, OH. It was issued by the Standards Council on July 16, 1998, with an effective date of August 5, 1998.

Changes other than editorial are indicated by a vertical rule in the margin of the pages on which they appear. These lines are included as an aid to the user in identifying changes from the previous edition.

This edition of NFPA 1127 was approved as an American National Standard on August 6, 1998.

### Origin and Development of NFPA 1127

Since 1978, technical progress in solid propellant rocket motors, rocket airframe materials, bonding agents, and construction techniques has resulted in the emergence of a new form of nonprofessional rocketry based on model rocketry but using larger and more powerful commercially made solid propellant rocket motors in larger and heavier rocket airframes. This new activity is called high power rocketry. Flying activities have taken place throughout the United States in locations where the authority having jurisdiction has been permissive of the activity and where the Federal Aviation Administration has granted waivers to Part 101 of the Federal Aviation Administration Regulations. Therefore, two decades of operational experience have been accumulated. Safety rules, operational procedures, and other facets of the activity have been worked out and tested. The activity has spawned its own organization, the Tripoli Rocketry Association, Inc., which has a representative on the NFPA Technical Committee on Pyrotechnics. The National Association of Rocketry, with longtime representation on the NFPA Technical Committee on Pyrotechnics and realizing the educational and sporting aspects of the activity, has also embraced high power rocketry. Both organizations believe that national standards, rules, and regulations can be and should be updated at this time. Indeed, the experience gained thus far exceeds that amassed by model rocketry when the first NFPA *Code for Model Rocketry*, NFPA 44L, was adopted.

The code contains instructional guidelines and specific standards for the design, construction, limitation of charge and power, and reliability of all high power rocket motors manufactured for sale to users; for the qualification and certification of users; for the design and construction of high power rockets propelled by these motors; and for the conduct of tests, launchings, and other operations involving rockets so that hazards are minimized.

The NFPA Technical Committee on Pyrotechnics believes that this code contains appropriate measures to safeguard this popular and growing activity. Although high power rocketry is not as widespread as model rocketry, the committee believes a separate NFPA code should be adopted for high power rocketry because of significant differences in operations and to prevent confusion of the two activities in the minds of public safety officials. Both of these consumer rocket activities should not be confused with the hazardous, uncontrolled operations of so-called “basement bombers,” who attempt to make their own propellants, rocket motors, and large metallic rocket vehicles. High power rocket activities should be allowed within the specifications of this code to guide our science-minded citizens safely.

The 1998 edition includes a completely revised Chapter 3 that incorporates requirements and safety provisions for hybrid motor technology. The committee also created a table of clearance distances to promote fire safety in the vicinity of the launch pad. Chapter 5 was revised to be consistent with federal regulations for the storage of low explosives (high power rocket motors and motor reloading kits).

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NOTE: Membership on a committee shall not in and of itself constitute an endorsement of the Association or any document developed by the committee on which the member serves.

**Committee Scope:** This Committee shall have primary responsibility for documents on the manufacture, transportation, and storage for consumer and display fireworks, pyrotechnic special effects and model and high power rocket motors; the use of display fireworks; and the construction, launching and other operations that involve model and high power rockets.

The Committee does not have responsibility for documents on the use of consumer fireworks by the general public and the use of pyrotechnic special effects before a proximate audience.

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**NFPA 1127****Code for****High Power Rocketry****1998 Edition**

**NOTICE:** An asterisk (\*) following the number or letter designating a paragraph indicates that explanatory material on the paragraph can be found in Appendix A.

Information on referenced publications can be found in Chapter 7.

**Chapter 1 General Requirements****1-1 Scope.**

**1-1.1** This code shall apply to the design, construction, limitation of propellant mass and power, and reliability of all high power rocket motors and motor components produced commercially for sale to or use by the certified user for education, recreation, and sporting competition.

**1-1.2** This code also shall apply to the design and construction of high power rocket vehicles propelled by the high power rocket motors specified in 1-1.1.

**1-1.3** This code also shall apply to the conduct of launch operations of high power rocket vehicles specified in 1-1.2.

**1-1.4** This code shall not apply to the design, construction, production, manufacture, fabrication, maintenance, launching, flight, test, operation, use, or other activity in connection with a high power rocket or high power rocket motor when carried out or engaged in by the following entities:

- (a) The government of the United States
- (b) Any state or local government
- (c) Any college or university
- (d) Any individual, firm, partnership, joint venture, corporation, or other business entity engaged, as a licensed for-profit business, in research, development, production, testing, maintenance, or supply of high power rockets, high power rocket motors, high power rocket propellant chemicals, or high power rocket components or parts for ultimate sale to qualified certified users in conformance with this code, or in connection with contracts with the federal or state governments or with commercial space transportation vehicle contractors or operating firms

**1-1.5** This code shall not apply to the design, construction, fabrication, production, manufacture, maintenance, launching, flight, test, operation, or use of rocket-propelled model aircraft that sustain their mass against the force of gravity by aerodynamic lifting surfaces during the entire duration of their flight in the air. However, this code shall apply to rocket motors and motor reload components used in such devices.

**1-1.6** This code shall not apply to model or toy rockets propelled by pressurized liquid rocket motors containing less than 8.45 oz (250 ml) of water.

**1-1.7** This code shall not apply to model rockets whose power and weight do not exceed the limits established in NFPA 1122, *Code for Model Rocketry*; fireworks rockets, skyrockets, and rockets with sticks, as defined in NFPA 1123, *Code for Fireworks Dis-*

*play*; NFPA 1124, *Code for the Manufacture, Transportation, and Storage of Fireworks and Pyrotechnic Articles*; or NFPA 1126, *Standard for the Use of Pyrotechnics Before a Proximate Audience*; or other types of rockets not covered by this code.

**1-2 Purpose.**

**1-2.1** The purpose of this code shall be to ensure the availability of high power rocket motors and components that meet national standards of safety and reliability stated herein to certified users.

**1-2.2** The purpose of this code also shall be to establish guidelines for reasonably safe operation of high power rockets in order to protect the user and the public.

**1-2.3** The purpose of this code also shall be to discourage experiments with explosive or highly energetic rocket propellants, construction of homemade rocket propulsion motors, and attempted launchings or operations of these homemade rocket devices, thereby minimizing tragic deaths and injuries.

**1-3 Definitions.** For the purposes of this code, the following terms shall be defined as stated in this section.

**Aero Model.** A miniature, unmanned replica of a flying device including the category of model or high power rocket, as defined in this section.

**Approved.\*** Acceptable to the authority having jurisdiction.

**Arm.** Rendering of an igniter from a safe (no energy) to a ready-to-fire condition.

**Authority Having Jurisdiction.\*** The organization, office, or individual responsible for approving equipment, an installation, or a procedure.

**Certified.** Approved or endorsed authoritatively.

**Certified High Power Rocket Motor.\*** A commercially made high power rocket motor that has been tested by a recognized testing organization that is acceptable to the authority having jurisdiction and found to meet the requirements set forth in this code.

**Certified User.\*** An individual, a distributor, or a seller who has been tested or otherwise examined by a recognized organization that is acceptable to the authority having jurisdiction and found to be qualified to purchase, possess, and use high power rocket motors.

**Code.\*** A standard that is an extensive compilation of provisions covering broad subject matter or that is suitable for adoption into law independently of other codes and standards.

**Commercial Manufacturer.** Any individual, firm, partnership, joint venture, corporation, or other business entity engaged as a licensed business in research, development, production, preparation, testing, maintenance, or supply of rockets, rocket motors, rocket propellant chemicals, rocket propellant, delay or ejection modules, or rocket components or parts.

**Complex High Power Rocket.** A high power rocket that is multistaged or propelled by a cluster of rocket motors intended for simultaneous ignition at launch or in the air.

**Flight Cylinder.** A high pressure container used in a nitrous oxide hybrid high power rocket motor system to contain pressurized nitrous oxide.

**High Power Rocket.** A rocket vehicle with the following properties:

- (a) Propelled by a single rocket motor having a total impulse of more than 160 newton-seconds (N-sec) or by any combination of motors with an installed total impulse of more than 320 N-sec and no more than 40,960 N-sec of installed total impulse; or
- (b) Weighs more than 53 oz (1500 g); or
- (c) Contains any single motor with an average thrust of more than 80 newtons (N); and
- (d) Contains a recovery device for returning it safely so it can be flown again; and
- (e) Made of paper, wood, fiberglass, or plastic with the minimum amount of metallic parts necessary for airframe integrity dependent on the installed total impulse; and
- (f) Primarily used for purposes of education, recreation, and sporting activities; and
- (g) Utilizes a motor with less than 160 N-sec that otherwise does not comply with NFPA 1122, *Code for Model Rocketry*. For purposes of launch site dimensions and safe distances, these motors shall be considered the equivalent of an H motor type.

**High Power Rocket Motor.** A rocket motor that has more than 160 N-sec but no more than 40,960 N-sec of total impulse or an average thrust greater than 80 N or more than 2.2 oz (62.5 g) of propellant and that otherwise meets the other requirements set forth in this code.

**Hybrid Rocket Motor.** A rocket motor whose fuel is in a different physical state (solid, liquid, or gaseous) than its oxidizer and that derives its force or thrust from the combination thereof.

**Inhabited Building.** Any building or structure regularly used in whole or part as a place of human habitation. The term includes any church, school, store, railway passenger station, airport passenger terminal, and any other building or structure where people are accustomed to congregating or assembling. The term does not include any building or structure occupied in connection with the manufacture, transportation, storage, or use of high power rockets, high power rocket motors, and motor reloading kits.

**Installed Total Impulse.** The sum of the total impulses of all rocket motors installed in a rocket and intended to be ignited during the launching and flight of that rocket.

**Labeled.** Equipment or materials to which has been attached a label, symbol, or other identifying mark of an organization that is acceptable to the authority having jurisdiction and concerned with product evaluation, that maintains periodic inspection of production of labeled equipment or materials, and by whose labeling the manufacturer indicates compliance with appropriate standards or performance in a specified manner.

**Launch Site.** An area used for high power rocket activities that includes the following:

- (a) A prepping area(s)
- (b) A launching area(s)
- (c) A recovery area(s)
- (d) A spectator area(s)
- (e) A parking area(s)

**Launch Site Parking Area.** An area designated by the range safety officer where spectators park their vehicles.

**Launching Area.** An area designated by the range safety officer in which high power rockets are placed on a launching device and ignited.

**Liquid Propellant Rocket Motor.** A rocket motor that contains a fuel and an oxidizer in liquid form or in a combined monopropellant liquid form as a single chemical and that derives its force or thrust from the combustion thereof.

**Listed.\*** Equipment, materials, or services included in a list published by an organization that is acceptable to the authority having jurisdiction and concerned with evaluation of products or services, that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services, and whose listing states that either the equipment, material, or service meets identified standards or has been tested and found suitable for a specified purpose.

**Model Rocket.** A rocket vehicle with the following properties:

- (a) Propelled by a model rocket motor(s) having a total impulse of no more than 160 N-sec or by any combination of model rocket motors with an installed total impulse no more than 320 N-sec
- (b) Weighs no more than 53 oz (1500 g)
- (c) Contains a recovery device for returning it safely so that it can be flown again
- (d) Made of paper, wood, fiberglass, or plastic, with a minimum amount of metallic parts necessary for airframe integrity dependent on installed total impulse
- (e) Primarily used for the purpose of education, recreation, and sporting activities.

**Model Rocket Motor.** A rocket motor that has a total impulse of no more than 160 N-sec, an average thrust of no more than 80 N, a propellant weight of no more than 2.2 oz (62.5 g), and that otherwise meets the requirements set forth in NFPA 1122, *Code for Model Rocketry*.

**Module.** A pyrotechnic component of a hybrid or reloadable rocket motor in which its chemical composition is preloaded into a finished assembly that does not necessitate mixing of ingredients by the user.

**Motor Reloading Kit.** A package that is designed and produced by a commercial manufacturer and contains all of the components and parts necessary to reload and reuse a reloadable high power rocket motor casing specifically designed and manufactured to use the components and parts. These components and parts normally include a propellant module(s), new rocket motor nozzle, new insulation component(s), prepackaged delay and ejection module(s), electrical igniter(s), and the parts necessary to seal the casing during operation.

**Prepping Area.** An area designated by the range safety officer where high power rockets and high power rocket motors are prepared for launch.

**Pressurized Liquid Rocket Motor.** A rocket motor that derives its force or thrust from a liquid expelled from the rocket motor by pressurized gas and whose discharge involves no combustion or change of state.

**Production Lot.** A quantity of solid propellant rocket motors or reloading kits or a pyrotechnic module(s) produced during a single work shift, on the same motor manufacturing device, or using the same batch of pyrotechnic material.

**Range Safety Officer (RSO).**\* The person with overall responsibility for the safety, setup, and launching of all high power rockets at a high power rocket launch.

**Recovery Area.** An area designated by the range safety officer for the recovery of high power rockets.

**Reloadable Rocket Motor.** A rocket motor that has been designed and manufactured so that the user can load, reload, and reuse the pressure-resisting body or casing, using the parts and components of a motor reloading kit certified for use with that rocket motor casing.

**Rocket.** A device that ascends into the air without use of aerodynamic lifting forces acting against gravity and that is propelled by one or more rocket motors.

**Rocket Engine.** See Rocket Motor.

**Rocket Motor.** A device or combination of devices that provides the necessary force or thrust to cause a rocket to move. The force or thrust is created by the discharge of gas generated by combustion, decomposition, change of state, or other discharge of materials contained, carried, or stored solely within said rocket motor or rocket and not dependent on the outside environment for reaction mass.

**Rocket Propellant.** The material(s) utilized in a rocket motor that produces thrust by the discharge of a working fluid generated by combustion, decomposition, change of state, or other discharge of such material contained, carried, or stored within said rocket motor.

**Rocket Vehicle.** See Rocket.

**Sealed Flight Cylinder.** A flight cylinder used in a nitrous oxide hybrid high power rocket motor system into which the nitrous oxide can be loaded prior to launch and stored for an indefinite period.

**Shall.** Indicates a mandatory requirement.

**Should.** Indicates a recommendation or that which is advised but not required.

**Skyrockets or Rockets with Sticks.** Commercially manufactured fireworks rockets not intended for reuse and that have been classified as Class 1.3G or 1.4G explosives in accordance with U.S. Department of Transportation regulations.

**Solid Propellant Rocket Motor.** A rocket motor containing a fuel and oxidizer in solid form and deriving its force or thrust from the combustion thereof.

**Spectator.** A nonparticipant whose primary purpose is to view a high power rocket launch.

**Spectator Area.** A designated area where spectators view a high power rocket launch.

**Steam Rocket Motor.** A rocket motor that produces its force or thrust by means of steam carried, stored, or produced within the rocket motor or vehicle.

**Structural Parts.** The load-bearing parts of a rocket, specifically the nose cone, body tube, and fins.

**Thrust Augmenter.** A device for increasing the force or motive power of a rocket motor by imparting a portion of the momentum of the rocket motor's exhaust jet to the surrounding environmental medium; it is considered to be a part of a rocket motor when and where it is used.

**Vented Flight Cylinder.** A flight cylinder used in a nitrous oxide hybrid high power rocket motor system that continu-

ously vents nitrous oxide to the atmosphere during the motor fill and ignition procedure.

## Chapter 2 Requirements for High Power Rocket Construction and Operation

**2-1 User Certification.** Only a certified user shall be permitted to operate or fly a high power rocket.

**2-2 Operating Clearances.** A person shall fly a high power rocket only in compliance with the following:

- (a) This code
- (b) *United States Code*, Title 49, Section 1348, "Airspace Control and Facilities," 72 Statute 749, Section 307, Federal Aviation Act of 1958, covering *Federal Aviation Administration Regulations*, from *Code of Federal Regulations*, Title 14, Chapter 1, Subchapter F, Part 101, Paragraph 101.1 through 101.25 or later revisions or amendments thereto
- (c) Other applicable federal, state, and local laws, rules, regulations, statutes, and ordinances

**2-3 Preflight Inspection.** A person shall fly a high power rocket only if it has been inspected and approved for operation immediately prior to flight by a range safety officer. The range safety officer shall confirm the rocket's compliance with the applicable provisions of this code and shall ascertain that the rocket will fly in a safe manner.

### 2-4 High Power Rocket Motors and Components.

**2-4.1** A person shall use only commercially manufactured certified high power rocket motors or motor reloading kits or components.

**2-4.2** No person shall dismantle, reload, or alter a single-use high power rocket motor. No person shall alter the components of a reloadable high power rocket motor or use the contents of a reloadable rocket motor reloading kit for a purpose other than those specified by the manufacturer in the rocket motor or reloading kit instructions.

**2-5 Rocket Construction.** A high power rocket shall be constructed in such a manner and with suitable materials to withstand the operating stresses and retain structural integrity under conditions expected or known to be encountered in flight.

**2-6 Rocket Airframe Materials.** A high power rocket vehicle intended to be propelled by one or more high power rocket motors shall be constructed using lightweight materials such as paper, wood, rubber, plastic, fiberglass, or, when necessary, ductile metal so that the rocket conforms to the other requirements of this code.

**2-7 Stability.** A person intending to operate a high power rocket shall determine its stability before flight. This person shall provide documentation of the location of the center of pressure and the center of gravity of the high power rocket to the range safety officer if said officer requests same.

### 2-8 Weight and Power Limits.

**2-8.1** A person intending to operate a high power rocket shall ensure that it weighs less than the rocket motor manufacturer's recommended maximum liftoff weight for the rocket motor(s) used for the flight. This person shall present documented proof of compliance with this requirement if it is

requested by the range safety officer during preflight inspection.

**2-8.2** No person shall install in a high power rocket a rocket motor or combination of rocket motors that will produce more than 40,960 N-sec of total impulse [4.45 N equals 1.0 lb (0.45 kg)].

**2-9 Recovery.**

**2-9.1** A person shall fly a high power rocket only if it contains a recovery system that will return all parts of the rocket safely to the ground so it can be flown again.

**2-9.2\*** A person preparing the high power rocket for flight shall install only flame-resistant recovery wadding if wadding is necessary by the design of the rocket.

**2-9.3** No person shall attempt to catch a high power rocket as it approaches the ground.

**2-9.4** No person shall attempt to retrieve a high power rocket from a hazardous area. The person flying the rocket shall attempt as soon as practicable to notify the utility company or other appropriate authority if the high power rocket becomes entangled in a power line when descending.

**2-10 Payloads.**

**2-10.1** No person shall install or incorporate in a high power rocket a payload that is intended to be flammable or explosive or to cause harm.

**2-10.2** No person shall fly a vertebrate animal in a high power rocket.

**2-11 Launching Devices.**

**2-11.1** A person operating a high power rocket shall launch it from a stable device that provides rigid guidance until the rocket has reached a speed adequate to ensure a safe flight path.

**2-11.2** The person launching the high power rocket shall ensure that the launcher incorporates a jet deflector device if necessary to prevent the rocket motor exhaust from impinging directly on flammable materials.

**2-11.3** A launching device shall not be used to launch a high power rocket at an angle more than 20 degrees from vertical.

**2-11.4** A person operating a high power rocket shall place the end of the launch rod or rail above eye level or cap it to prevent accidental eye injury. A person shall store a launch rod or rail so it is capped, cased, or left in a condition where it cannot cause injury.

**2-12 Ignition Systems.**

**2-12.1** A person launching a high power rocket shall use an ignition system that is remotely controlled, is electrically operated, and contains a launching switch that will return to the off position when released.

**2-12.2** The ignition system shall contain a removable safety interlock device in series with the launch switch.

**2-12.3** The launch system and igniter combination shall be designed, installed, and operated so the liftoff of the rocket occurs within 3 seconds of actuation of the launch system. If the rocket is propelled by a cluster of rocket motors designed to be ignited simultaneously, the person operating the rocket shall install an ignition scheme that either has been previously

tested or has a demonstrated capability of igniting all rocket motors intended for launch ignition within 1 second following ignition system activation.

**2-12.4** A person shall install an ignition device in a high power rocket motor at the launcher or within the area designated by the safety monitor. The rocket shall be pointed in a safe direction during and after installation of the ignition device.

**2-12.5** No firing circuits shall be armed with the rocket in other than a launching position.

**2-13\* Launch Site.**

**2-13.1** A person shall launch a high power rocket only in an outdoor area where tall trees, power lines, and buildings will not present a hazard, in the opinion of the range safety officer, to the safe flight operation of a high power rocket.

**2-13.2** The minimum launch site shall be of one of the following dimensions:

- (a) No less than one-half the maximum altitude expected, calculated, simulated, or granted by the FAA waiver/authority having jurisdiction
- (b) The size shown in Table 2-13.2.

**Table 2-13.2 Launch Site Dimensions**

Installed Total Impulse N-sec	Equivalent Motor Type	Minimum Site Dimensions		Equivalent	
		ft	mi	m	km
160.01 to 320.00	H	1500	0.3	457	0.5
320.01 to 640.00	I	3000	0.6	914	1.0
640.01 to 1,280.00	J	5280	1.0	1,609	1.6
1,280.01 to 2,560.00	K	5280	1.0	1,609	1.6
2,560.01 to 5,120.00	L	10,560	2.0	3,219	3.2
5,120.01 to 10,240.00	M	15,840	3.0	4,828	4.8
10,240.01 to 20,480.00	N	21,120	4.0	6,437	6.4
20,480.01 to 40,960.00	O	26,400	5.0	8,047	8.0

Note: For a circular area, the minimum launch site dimension is the diameter in feet; for a rectangular area, it is the shortest side in feet.

**2-13.3** In no case shall the minimum launch site dimension be less than 1500 ft (457 m).

**2-13.4** Fire suppression devices and first aid kits shall be available.

**2-14 Launcher Location.**

**2-14.1** The person launching a high power rocket shall ensure that the ground around a launcher for a diameter at least as large as that stated in Table 2-14.1 is clear of brown grass, dry weeds, or other easy-to-burn materials that could be ignited during launch by the exhaust of the rocket motor.

**Table 2-14.1 Launcher Clear Distances**

Installed Total Impulse N-sec	Launcher Equivalent Motor Type	Minimum Clear Distance	
		ft	m
160.01 to 320.00	H	50	15
320.01 to 640.00	I	50	15
640.01 to 1,280.00	J	50	15
1,280.01 to 2,560.00	K	75	23
2,560.01 to 5,120.00	L	100	30
5,120.01 to 10,240.00	M	125	38
10,240.01 to 20,480.00	N	125	38
20,480.01 to 40,960.00	O	125	38

**2-14.2** The person intending to launch a high power rocket shall locate the launcher at a distance of one-half the launch site dimension or 1500 ft (457 m), whichever is greater, from any inhabited building or public highway on which traffic flow exceeds 10 vehicles per hour, not including traffic flow related to the launch.

*Exception: Inhabited building(s) shall be permitted to be located within the launch site with the approval of the authority having jurisdiction and the owner(s) of the inhabited building(s), if the inhabited building(s) is unoccupied during the launch.*

**2-15 Safe Distances.**

**2-15.1** No person shall be closer to the launch of a high power rocket than the person actually launching the rocket and those authorized by the range safety officer.

**2-15.2** All spectators shall remain within an area determined by the range safety officer and shall remain behind the range safety officer and the person launching the rocket.

**2-15.3** No person shall be closer to the launch of a high power rocket than the applicable minimum safe distance set forth in Table 2-15.3.

**2-16 Launch Operations.**

**2-16.1** No person shall ignite and launch a high power rocket horizontally, at a target, or such that the rocket's flight path goes into clouds or beyond the boundaries of the launch site.

**2-16.2** No person shall launch a high power rocket if the surface wind at the launcher is more than 20 mph (32 kmph).

**2-16.3** No person shall operate a high power rocket in a manner that is hazardous to aircraft.

**2-17 Launch Control.**

**2-17.1** A person shall launch a high power rocket only with the immediate knowledge, permission, and attention of the range safety officer.

**2-17.2** All persons in the launching, prepping, spectator, and parking areas during a countdown and launch shall be standing and facing the launcher if requested to do so by the range safety officer.

**Table 2-15.3 Minimum Safe Distance (Complex High Power Rocket)**

Installed Total Impulse (N-sec)	Equivalent Motor	Minimum Safe Distance		Minimum Safe Distance (complex rocket)	
		ft	m	ft	m
160.00 to 320.00	H	100	30	200	61
320.01 to 640.00	I	100	30	200	61
640.01 to 1,280.00	J	100	30	200	61
1,280.01 to 2,560.00	K	200	61	300	91
2,560.01 to 5,120.00	L	300	91	500	152
5,120.01 to 10,240.00	M	500	152	1000	305
10,240.01 to 20,480.00	N	1000	305	1500	457
20,480.01 to 40,960.00	O	1500	457	2000	610

*Exception: Those individuals that have mobility restrictions.*

**2-17.3** The person launching a high power rocket shall precede the launch with a 5-second countdown audible throughout the launching, spectator, and parking areas. This countdown shall be given by the person launching the rocket, the range safety officer, or other flying site operating personnel.

**2-17.4** No person shall approach a high power rocket that has misfired until the safety interlock has been removed or until the battery has been disconnected from the ignition system, 1 minute has passed, and the range safety officer has given permission for only a single person to approach the misfired rocket in order to inspect it.

**2-18 Storage of High Power Rocket Motors, Motor Reloading Kits, and Pyrotechnic Modules.**

**2-18.1** High power rocket motors, motor reloading kits, and pyrotechnic modules shall be stored at least 25 ft (7.6 m) away from smoking, open flames, and other sources of heat.

**2-18.2** No more than 50 lb (23 kg) of net propellant weight of high power rocket motors, motor reloading kits, or pyrotechnic modules shall be stored in a Type 3 or a Type 4 indoor magazine as described in Title 27, Code of Federal Regulations, Part 55. Indoor magazines shall be painted red, and the top shall bear the words EXPLOSIVES — KEEP FIRE AWAY in white letters at least 3 in. (76 mm) high.

*Exception: This requirement shall not apply to solid propellant rocket motors, motor reloading kits, pyrotechnic modules, or any other solid propellant rocket motor products that are exempt under Title 27, Code of Federal Regulations, Part 55, Subpart H, Section 55.141.*

**2-18.2.1** The magazine shall not be located in any residence.

**2-18.2.2** The indoor magazine shall be permitted to be located in a detached garage or outbuilding substantially removed or segregated from any residence.

**2-18.2.3** The indoor magazine shall be permitted to be located in an attached garage in a single-family residence.

**2-18.2.4** The indoor magazine shall be permitted to be located in an attached garage of a multifamily residence or duplex if the magazine is surrounded on all sides by a 1-hour fire-rated barrier.

**2-18.2.5** Pyrotechnic high power solid propellant rocket motors, motor reloading kits, modules, or any other solid propellant motor products that are exempt under Title 27, *Code of Federal Regulations*, Part 55, Subpart H, Section 55.141, shall be stored in a reclosable, noncombustible container.

**2-18.3 Large-Quantity Storage.**

**2-18.3.1** More than 50 lb (22.7 kg) of net propellant weight of high power rocket motors, motor reloading kits, or pyrotechnic modules shall be stored in a Type 4 outdoor magazine or greater as described in Title 27, *Code of Federal Regulations*, Part 55.

*Exception: This requirement shall not apply to solid propellant rocket motors, motor reloading kits, pyrotechnic modules, or any other solid propellant rocket motor products that are exempt under Title 27, Code of Federal Regulations, Part 55, Subpart H, Section 55.141.*

**2-18.3.2** The magazine shall meet the distance requirements in Table 2-18.3.2.

**2-18.4** High power rocket motors, motor reloading kits, and pyrotechnic modules shall be stored in accordance with all applicable federal, state, and local laws, rules, regulations, statutes, and ordinances.

**Chapter 3 Requirements for High Power Rocket Motors**

**3-1 General Requirements.**

**3-1.1** A high power rocket motor shall be designed such that the temperature of the external surface of the motor casing and fittings, if any, shall not exceed 392°F (200°C) during or after operation.

**3-1.2** A high power rocket motor casing shall be so designed and constructed that, if it ruptures, it will not project any casing fragments beyond a radial distance of one-half the distance shown as a safe distance in Table 2-15.3.

**3-1.3** A high power rocket motor whose casing is metallic shall be so designed and constructed that its normal failure mode shall lead to all separated parts traveling along the longitudinal axis of the motor.

**3-1.4** The metallic casing of a high power rocket motor shall be made of 6061-T6 or equivalent aluminum alloy.

**3-1.5** A high power rocket motor using a reloadable metallic casing shall have its casing designed to withstand at least twice the design maximum operating pressure of the motor.

**Table 2-18.3.2 Storage Distances for Low Explosives**

Weight Over		Weight Not Over		Distance From Inhabited Building		Distance From Public Railroad and Highway		Distance from Aboveground Magazine	
lb	kg	lb	kg	ft	m	ft	m	ft	m
0	0	1,000	454	75	23	75	23	50	15
1,000	454	5,000	2,268	115	35	115	35	75	23
5,000	2,268	10,000	4,536	150	46	150	46	100	30
10,000	4,536	20,000	9,072	190	58	190	58	125	38
20,000	9,072	30,000	13,608	215	66	215	66	145	44
30,000	13,608	40,000	18,144	235	72	235	72	155	47
40,000	18,144	50,000	22,680	250	76	250	76	165	50
50,000	22,680	60,000	27,216	260	79	260	79	175	53
60,000	27,216	70,000	31,751	270	82	270	82	185	56
70,000	31,751	80,000	36,287	280	85	280	85	190	58
80,000	36,287	90,000	40,823	295	90	295	90	195	59
90,000	40,823	100,000	45,360	300	91	300	91	200	61
100,000	45,360	200,000	90,718	375	114	375	114	250	76
200,000	90,718	300,000	136,078	450	137	450	137	300	91

Note: Table is extracted from 27 *CFR*, Part 55 (BATF regulations for the storage of explosive materials).

**3-1.6** A high power rocket motor, motor reloading kit, or pyrotechnic component shall be so designed and constructed as not to ignite when subjected to temperatures of 257°F (125°C) for a duration of no less than 30 minutes.

**3-1.7** The solid propellant of a high power rocket motor shall contain no metal particles larger than 100 mesh (150 microns) and shall be designed to produce a minimum of ejected particles or sparks.

### **3-2 Solid Propellant High Power Rocket Motors.**

**3-2.1** A solid propellant high power rocket motor shall be produced by a commercial manufacturer.

**3-2.2** A solid propellant high power rocket motor shall have all of the propellant in either of the following conditions:

- (a) Preloaded into the motor casing if a solid propellant high power rocket motor is designed to be expendable
- (b) Available in a premanufactured module(s) if the propellant is designed to be used in a reloadable solid propellant high power rocket motor

**3-2.3** The solid propellant high power rocket motor shall be designed in such a manner that the propellant meets one of the following requirements:

- (a) Cannot be removed without destroying the motor
- (b) Is a premanufactured module(s) intended to be inserted into a reloadable solid propellant high power rocket motor casing

**3-2.4** Delay trains and ejection charges shall be permitted to be included as an integral part of the motor, or they shall be permitted to be packaged separately, if these auxiliary packages are designed so that an individual would have no difficulty handling and using them safely.

**3-2.5** Propellant grains packaged in motor reloading kits for reloadable solid propellant high power rocket motors shall be shipped and stored in an insulating sleeve of equal or greater length than the propellant grain.

**3-2.5.1\*** The insulating sleeve shall have low thermal conductivity and a thickness of not less than 0.030 in. (0.80 mm).

### **3-3 Hybrid Propellant High Power Rocket Motors.**

#### **3-3.1 General Requirements.**

**3-3.1.1** A hybrid propellant high power rocket motor shall be produced by a commercial manufacturer.

**3-3.1.2** A hybrid propellant high power rocket motor shall use pressurized nitrous oxide as an oxidizer combined with a separate solid fuel.

**3-3.1.2.1** The solid fuel shall be in either of the following conditions:

- (a) Preloaded into the motor casing if a hybrid propellant high power rocket motor is designed to be expendable
- (b) Available in a premanufactured module(s) if the fuel is designed to be used in a reloadable hybrid propellant high power rocket motor

**3-3.1.3** Pyrotechnic modules intended for use in the operation of a hybrid propellant high power rocket motor shall be completely premanufactured.

**3-3.1.4** Pyrotechnic modules weighing 0.7 oz (20 g) or more and packaged in motor reloading kits for reloadable hybrid

propellant high power rocket motors shall be shipped and stored in an insulating sleeve of equal or greater length than the pyrotechnic module.

**3-3.1.4.1\*** The insulating sleeve shall have low thermal conductivity and a thickness of not less than 0.030 in. (0.80 mm).

**3-3.1.5** Hybrid propellant high power rocket motors using pyrotechnic modules shall be so designed and constructed that the maximum pressure generated by the pyrotechnic module(s) alone shall not exceed 400 psi (2760 kPa) at 68°F ± 9°F (20°C ± 5°C).

**3-3.1.6** Hybrid propellant high power rocket motors using pyrotechnic modules shall be so designed and constructed that the motor combustion chamber shall fail at a pressure no greater than one-half of the flight cylinder's design yield pressure.

#### **3-3.2 Requirements for Sealed Hybrid Motor Systems.**

**3-3.2.1** Flight cylinders used in sealed hybrid motor systems shall be made of aluminum alloy or a composite-overwrapped aluminum shell.

**3-3.2.2** Flight cylinders shall comply with Title 49, *Code of Federal Regulations*, Part 178, Subpart C for storage of nitrous oxide.

**3-3.2.3** Metallic components of valves used in sealed flight cylinders shall be constructed of brass, aluminum, or stainless steel.

**3-3.2.4** Internal valve nonmetallic sealing components exposed to flowing pressurized nitrous oxide shall be made of noncombustible materials such as Teflon® polytetrafluoroethylene polymer.

*Exception: This requirement shall not apply to pyrotechnic valve sealing components that are designed to be consumed upon ignition.*

**3-3.2.5** Pyrotechnic valve sealing components shall be capable of maintaining their structural integrity up to the rated working pressure of the nitrous oxide flight cylinder or 1800 psi (10 MPa), whichever is greater, prior to ignition.

**3-3.2.6** Pyrotechnic valve sealing components shall be isolated from direct contact with pressurized nitrous oxide prior to ignition.

**3-3.2.7** Sealed flight cylinders used for storage of pressurized nitrous oxide shall be equipped with a pressure relief valve that will function at a pressure no greater than one-half of the cylinder design yield pressure.

**3-3.2.8** Sealed flight cylinders used for storage of pressurized nitrous oxide shall have the tare weight of the cylinder and the maximum permissible nitrous oxide fill weight clearly and legibly imprinted on the exterior surface of the cylinder.

**3-3.2.8.1** The maximum permissible nitrous oxide fill weight shall not exceed that allowed by Title 49, *Code of Federal Regulations*, Part 178, Subpart C.

**3-3.2.9** Warning and other labels applied by the cylinder manufacturer shall not be removed.

#### **3-3.3 Requirements for Vented Hybrid Motor Systems.**

**3-3.3.1** Flight cylinders used in vented hybrid motor systems shall be made of aluminum alloy or a composite-overwrapped aluminum shell.

**3-3.3.2** Flight cylinders used in vented hybrid motor systems shall have a design yield pressure of at least 3000 psi (21 MPa) and shall have been proof-tested to at least 2000 psi (14 MPa).

**3-3.3.2.1** The manufacturer's approval and testing date shall be clearly and legibly imprinted on the exterior surface of the cylinder.

**3-3.3.3** Vented flight cylinders shall be designed and constructed so that their normal failure mode shall lead to all separated parts traveling along the longitudinal axis of the cylinder.

**3-3.3.4** Vented flight cylinders shall be capable of being remotely emptied of nitrous oxide at any time prior to ignition of the hybrid rocket motor.

**3-3.3.5** Vented flight cylinders shall be filled and unloaded remotely at a distance equal to or greater than that shown as a safe distance in Table 2-15.3 for their representative motor class.

**3-4 Manufacturer Requirements.**

**3-4.1** A manufacturer of a high power rocket motor(s) or motor reloading kit(s) shall subject a random sample of 1 percent of each production lot to a static test that shall measure and record the high power rocket motor's total impulse, delay time, if included, and action of ejection charge, if included.

*Exception: As an alternative to a random sample of 1 percent of each production lot, a written quality control plan and record keeping shall be permitted to be maintained for production lots of propellant composition, delay composition, and motor components to ensure compliance with this code.*

**3-4.1.1** High power rocket motor production lots shall be corrected, destroyed, or retested by the manufacturer under any of the following conditions:

- (a) The total impulse of a test item departs more than 10 percent from the certified mean total impulse value of the high power rocket motor type.
- (b) The time delay, if any, of a test item departs more than 20 percent from the established mean time delay value of the high power rocket motor type. However, in no case shall this variation exceed 3 seconds.
- (c) The ejection charge, if any, of a test item does not function properly.
- (d) A test item malfunctions in any other manner that affects the safety of its shipment, storage, handling, or use.

**3-4.2** Static tests shall be conducted with the test items at 50°F–86°F (20°C ± 10°C).

**3-4.3** For a retest, a manufacturer shall test a minimum additional 2 percent of the production lot in question. If any additional test item displays any of the preceding conditions, the entire production lot shall be corrected or destroyed by the manufacturer.

**3-4.4** A high power rocket motor or motor reloading kit whose performance deviates from the sample test criteria and performance limits detailed above within 5 years from the date of manufacture shall be withdrawn from commercial sale and redesigned to provide reliable operation when ignited within a period of 5 years from the date of manufacture.

**3-4.5** If the expected shelf life of a high power rocket motor or motor reloading kit is less than 10 years, the manufacturer shall imprint a "use before" date on the package or motor casing.

**3-4.6** No manufacturer, distributor, or other person shall sell, expose for sale, or otherwise make available to the public any type of high power rocket motor ignition device that is intended to be initiated by a handheld flame.

**3-5 Shipping and Packaging.**

**3-5.1** A high power rocket motor shall be shipped, stored, and sold with no ignition element installed.

**3-5.2** A high power rocket motor or motor reloading kit shall be shipped and sold with complete instructions for its storage, handling, and use.

**3-5.2.1** The instructions shall contain the following information:

- (a) Wording that warns the user to read and follow all instructions
- (b) Information on how to safely ignite the high power rocket motor by electrical means
- (c) Performance data on the high power rocket motor type, including propellant weight(s), total impulse, average thrust, time delay, and representative thrust-time curve
- (d) Any special first aid data or action to be taken in the event of thermal or freeze burns, inhalation of nitrous oxide or exhaust products, or oral ingestion of any pyrotechnic components
- (e) Proper and safe disposal of the high power rocket motor, motor reloading kit, or pyrotechnic module, if it has become too old, has been subjected to conditions that could impair its performance, or, in the opinion of the user, has become unsafe
- (f) Any special action that shall be taken in case of fire in which stored high power rocket motors, motor reloading kits, filled compressed gas cylinders, or pyrotechnic modules are involved
- (g) If a solid or hybrid propellant motor reloading kit, safety precautions for handling the propellant and pyrotechnic materials and directions for cleaning and other necessary post-firing maintenance on the motor casing
- (h) If a hybrid propellant rocket motor or hybrid motor reloading kit, safety precautions for the handling of compressed gases used, personal protective equipment required during assembly, warnings and instructions for the avoidance of petroleum greases and oils in the vicinity of pressurized nitrous oxide or oxygen, recommendations for greases that can safely be used, proper cylinder filling weights and procedures, safe remote loading instructions, and cleaning and other necessary post-firing maintenance of the ground support equipment supplied or recommended by the manufacturer
- (i) Warnings prohibiting tampering with, unauthorized disassembly, or misuse of any components of the high power rocket motor, motor reloading kit, or special ground support equipment intrinsic to the safe use of the high power rocket motor

**3-5.3** The package containing the motor reloading kit for use in a reloadable high power rocket motor shall have visible identification that will identify the motor casing type in which it shall be installed.

**3-5.4** The package containing the motor reloading kit shall display instructions that the kit shall not be opened until the user is ready to install the motor reloading kit parts, including the propellant module(s), in the reloadable high power rocket motor casing.

**3-5.5** A high power rocket motor or motor reloading kit shall have imprinted on its external surface or package the following information:

- (a) The name of the importer, manufacturer, or distributor
- (b) A recognized code using the nomenclature "Xyy-zz" where X is a letter representing the total impulse as shown in Table 2-13.2, yy is a number indicating the average thrust in newtons, and zz is a number indicating the delay in seconds before ejection
- (c) A lot number or manufacture date that shall be permitted to be encoded

**3-5.5.1** All information imprinted on the external surface or package of a high power rocket motor or motor reloading kit shall be legible.

**3-5.6** High power rocket motors, motor reloading kits, and pyrotechnic components shall be marked with information complying with the Federal Hazardous Substances Act of Title 16, *Code of Federal Regulations*, Part 1500.

## Chapter 4 High Power Solid Propellant Rocket Motor Testing and Certification

**4-1 Certification Requirement.** A high power rocket motor type or motor reloading kit offered for sale, exposed for sale, sold, used, or made available shall be examined and tested by the authority having jurisdiction to determine whether the type complies with the requirements and tests detailed in Chapter 3.

**4-1.1** The authority having jurisdiction shall certify as acceptable for sale and use those high power rocket motor types and motor reloading kits that do comply.

**4-1.2\*** At the discretion of the authority having jurisdiction, such examination, testing, and certification shall be permitted to be carried out by an approved testing laboratory or a national user organization having such capabilities.

**4-1.3** The certification of a high power rocket motor or motor reloading kit that contains pyrotechnic components shall require that the following prerequisites be met:

- (a) Its prior classification by the U.S. Department of Transportation as a UN Division 1.3 or 1.4 explosive, or written acknowledgment from the U.S. Department of Transportation that the high power rocket motor or motor reloading kit is a flammable solid

*Exception: This prerequisite shall not apply to high power rocket motors or motor reloading kits that do not contain a pyrotechnic module.*

- (b) Obtaining from the manufacturer of the high power motor or motor reloading kit a letter stating that the samples submitted for testing were manufactured in compliance with the provisions of this code and NFPA 1125, *Code for the Manufacture of Model Rocket and High Power Rocket Motors*, and that all future production of certified motors will be manufactured in compliance with the provisions of these codes

**4-1.4** The authority having jurisdiction shall examine one or more samples of a high power rocket motor or reloadable motor system for the following conditions before granting such certification:

- (a) Verification that the propellant composition of the high power rocket motor(s), motor reloading kit(s), or pyrotechnic module(s) complies with NFPA 1125, *Code for the Manufacture of Model Rocket and High Power Rocket Motors*
- (b) Static testing to determine whether total impulse and delay time comply with the requirements of 3-4.1.1
- (c) For metal casing motors, destructive testing to ensure that the casing complies with the requirements of 3-1.3 through 3-1.5
- (d) Thermal testing to ensure that the casing temperature during and after static firing complies with 3-1.1
- (e) Heat sensitivity testing to ensure that the motor or motor reloading kit complies with 3-1.6
- (f) Examination of the packaging, labeling, and instructions to verify compliance with all provisions of this code

**4-1.5** Static tests shall be conducted with the test items at 59°F–77°F (20°C ± 5°C).

**4-1.6** Hybrid high power rocket motor flight cylinders shall be filled to their maximum allowable net weight for each test firing.

**4-1.7** Hybrid high power rocket motor test items shall be configured and oriented so that liquid nitrous oxide is dispensed from the oxidizer cylinder into the motor combustion chamber during motor operation until just before the cylinder is empty.

**4-1.8** Within 30 days, manufacturers shall report to the authority that originally certified a motor, motor reloading kit, or component any changes in the design or performance of such motor, motor reloading kit, or component made after its certification testing.

**4-2 List of Certified High Power Rocket Motors.** The authority having jurisdiction shall maintain a current and complete list of all those high power rocket motor types and motor reloading kits that are certified as complying with the requirements and tests detailed in Chapter 3 and shall make copies of this list available to citizens and public safety officials who request it.

## Chapter 5 High Power Rocket Motor User Certification

**5-1 Sales Only to Certified Users.** A high power rocket motor or motor reloading kit shall be sold to, shipped to, stored by, and used only by certified users.

**5-2 User Permit Requirements.** A "User of Low Explosives Permit" as defined in Title 27, *Code of Federal Regulations*, Part 55, is required prior to both of the following:

- (a) Acquisition by a certified user of a high power solid propellant rocket motor(s) or motor reloading kit(s) in a state other than where the user resides

*Exception No. 1: This requirement shall not apply to the transportation, shipment, or receipt of high power rocket motor(s) or motor reloading kit(s) by a nonpermittee who lawfully purchases high power rocket motor(s) or motor reloading kit(s) from a licensee in a state contiguous to the purchaser's state of residence, if the purchaser's state of residence*

has enacted legislation, currently in force, specifically authorizing a resident of that state to purchase explosive materials in a contiguous state.

*Exception No. 2: This requirement shall not apply to solid propellant rocket motors, motor reloading kits, pyrotechnic modules, or any other solid propellant rocket motor products that are exempt under Title 27, Code of Federal Regulations, Part 55, Subpart H, Section 55.141.*

- (b) Transportation by a certified user of a high power solid propellant rocket motor(s) or motor reloading kit(s) to a state other than where the user resides

*Exception No. 1: This requirement shall not apply to the transportation, shipment, or receipt of higher power rocket motor(s) or motor reloading kit(s) by a nonpermitter who lawfully purchases high power rocket motor(s) or motor reloading kit(s) from a licensee in a state contiguous to the purchaser's state of residence, if the purchaser's state of residence has enacted legislation, currently in force, specifically authorizing a resident of that state to purchase explosive materials in a contiguous state.*

*Exception No. 2: This requirement shall not apply to solid propellant rocket motors, motor reloading kits, pyrotechnic modules, or any other solid propellant rocket motor products that are exempt under Title 27, Code of Federal Regulations, Part 55, Subpart H, Section 55.141.*

### 5-3 Maintenance of Sales Records.

**5-3.1** High power rocket motor manufacturers, distributors, and sellers shall maintain a list of those certified users to whom they have sold high power rocket motors or motor reloading kits. This list shall contain the following information:

- (a) Name and address of the purchaser
- (b) Name and address of the national user organization that has certified the user
- (c) The type and number of high power solid propellant rocket motors or motor reloading kits sold to the certified user
- (d) The date of sale and shipment of high power rocket motors or motor reloading kits to the certified user

**5-3.2** The manufacturer, distributor, or seller shall make available, on request and at a reasonable time, the records specified in 5-3.1 to any law enforcement person or the authority having jurisdiction. These records shall be kept for five years from the date of sale.

### 5-4 User Certification Provisions.

**5-4.1** A person who is a certified user shall meet the following minimum provisions:

- (a) The person shall be at least 18 years of age and shall provide proof of age upon applying for certification.
- (b) The person shall show a level of knowledge and competence acceptable to the certifying organization in handling, storing, and using a high power solid propellant rocket motor and high power rockets.

**5-4.2** The certifying organization shall maintain a list of all persons it certified as high power rocket motor users.

**5-4.2.1** The list shall be updated no less than once every 30 days.

**5-4.2.2** Upon request and receipt of applicable fees, if any, confirmation of an active member's user certification shall be made available to the following:

- (a) A law enforcement official or authority having jurisdiction
- (b) A manufacturer of high power rocket motors and motor reload kits
- (c) A retailer licensed to sell, distribute, or offer for sale high power rocket motors and motor reloading kits

## Chapter 6 Prohibited Activities

**6-1 Prohibited Acts.** The following activities shall be prohibited by this code:

- (a) The use of a high power rocket motor for the primary purpose of producing a spectacular display of color, light, sound, or any combination thereof

*Exception No. 1: This prohibition shall not be construed as prohibiting the public demonstration of high power rockets as defined herein and as certified according to these regulations.*

*Exception No. 2: This prohibition shall not be construed as prohibiting the use of chemical additives to the propellant in order to produce a brightly colored exhaust flare or dense colored smoke to aid in following or tracking the rocket in flight.*

- (b) The use of a high power rocket or high power rocket motor as a weapon against a target
- (c) The tampering with a high power rocket motor, motor reloading kit, or module in any manner or degree that is contrary to the purpose for which said high power rocket motor or motor reloading kit is designed and intended to be used
- (d) The sale, offering for sale, exposing for sale, or otherwise making available a rocket motor or motor reloading kit that does not comply with the requirements herein and has not been certified in accordance with Chapter 4

*Exception No. 1: This prohibition shall not be construed as prohibiting the transfer of rocket motors or motor reloading kits to a certifying authority for the purpose of testing for certification.*

*Exception No. 2: This prohibition shall not be construed as prohibiting the transfer, sale, offering for sale, exposing for sale, or otherwise making available model rocket motors, motor reloading kits, or modules complying with NFPA 1122, Code for Model Rocketry.*

- (e) The operation, discharge, or activation of a high power rocket contrary to the provisions of Federal Aviation Administration regulations
- (f) The manufacture, production, fabrication, operation, maintenance, launch, flight, test, discharge, or other experimentation with high power rocket motors, motor reloading kits, or pyrotechnic modules that have not been certified in accordance with the provisions of Chapter 4 including, but not limited to, cold propellant rocket motors, hybrid rocket motors, liquid propellant rocket motors, steam rocket motors, and rocket propellant chemicals, including monopropellants, for solid, liquid, and hybrid rocket motors

*Exception: This prohibition shall not be construed as prohibiting the evaluation and certification of new high power rocket motor technology by a recognized national user organization or an authority having jurisdiction, provided that all other requirements of this code are complied with and all activities are in accordance with applicable federal, state, and local laws, regulations, and ordinances.*

- (g) The sale, offering for sale, exposing for sale, making, or using of fuse, wick, or other ignition devices intended to