

## CCR Title 19

### Chapter 6. Fireworks

#### §980. Definitions.

##### (a) "A" Definitions.

- (1) Aerial Shell. A cylinder or spherical cartridge containing a burst charge and pyrotechnic or non-pyrotechnic effects, a fuse, a black powder lift charge and is fired from a mortar.
- (2) ASTM. The American Society of Testing and Materials, a national organization publishing standards for all types of materials and products.

##### (b) "B" Definitions.

- (1) Barrage. A rapidly fired sequence of effects.
- (2) Batten. A strip of wood to which pyrotechnic devices are attached for support.
- (3) Binary Low Explosive Compounds. Special effects materials in which fuel and an oxidizer are mixed together to produce a pyrotechnic composition.
- (4) Blank Cartridge. A cartridge constructed from either metal or plastic casing, with a center or rim fire primer filled with various amounts of pyrotechnic compositions measured by loads.
- (5) Blasting Galvanometer. An electrical resistance measuring device designed specifically and approved for testing of electric firing circuits.
- (6) Bottle Rocket. A pyrotechnic device containing a maximum of 20 grams of pyrotechnic composition, which rises into the air upon ignition. A stick is used for guidance and stability, and a burst of color or noise, or both, is produced at height of flight.
- (7) Break. An individual burst from an aerial shell, producing either a visible or audible effect or both, and may consist of a single burst or multiple effects.
- (8) Bullet Effect. The discharge of the pyrotechnic or explosive bullet hit.
- (9) Bullet Hit. A device containing various levels and amounts of pyrotechnic composition, whose purpose is to create the illusion of a bullet impact.

##### (c) "C" Definitions.

- (1) California Candle. Handheld heavy paper or cardboard tube emitting showers of sparks.
- (2) Comet. A pyrotechnic device launched from a mortar that produces an ascending burning effect, is self-consuming, and may or may not contain a burst charge or stars.
- (3) Commercial Manufacturer. Any individual, firm, partnership, joint venture, corporation, or other business entity engaged 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. Licensed by CSFM (NFPA 1127 3.3.5)

(d) "D" Definitions.

- (1) Darts. To move suddenly and swiftly from one place to another.
- (2) Detonator. Any device containing a detonating charge that is used for initiating detonation in an explosive. The term includes, but is not limited to, electric blasting caps of instantaneous and delay types, detonating cord delay connectors, and nonelectric instantaneous and delay blasting caps.
- (3) D.O.T. DOT means U.S. Department of Transportation.
- (4) Dud. A pyrotechnic item which leaves the mortar and returns to earth without producing the intended burst or effect. See also Misfire.

(e) "E" Definitions.

- (1) Electric Firing. A technique used to discharge fireworks in which an electric match or squib and a source of electric current are used to ignite fuses or lift charges.
- (2) Electric Match. An electric device containing a pyrotechnic compound which ignites when sufficient current flows through the leads.
- (3) Experimental Rocket. A rocket that (A) is propelled by two or more high power rocket motors with a total impulse of greater than 40,960 Newton-seconds (9209 lb.-seconds), or (B) is propelled by one or more experimental rocket motors.
- (4) Experimental Rocket Motor. A rocket motor that (A) is not commercially manufactured, or (B) is not CSFM approved, or (C) does not meet the definition of a Model Rocket Motor, or (D) does not meet the definition of a High-Power Rocket Motor, or (E) has a total impulse greater than 40,960 Newton-seconds (9209 lb.-seconds).

(f) "F" Definitions.

- (1) Firecracker. A device containing explosive pyrotechnic composition in an amount not to exceed 50 milligrams (.772 grains) in total pyrotechnic weight, in a fused container whose primary function is to produce an audible effect. Note: All firecrackers are classified as "dangerous fireworks", and pyrotechnic devices similar in construction to a "firecracker" which exceed the specified weight shall be designated explosives in accordance with Health and Safety Code Section 12000.
- (2) Flash Paper. Treated paper which is extremely sensitive to heat and creates a brief flash of fire upon ignition.
- (3) Flash Powder. Pyrotechnic composition intended for use in firecrackers and salutes, and often used for "flash"-type effects on stage and in productions involving special effects. Flash powder produces an audible report and a flash of light when ignited. Typical flash powder

compositions contain potassium chlorate or potassium perchlorate, sulfur or antimony sulfide, and powdered aluminum.

(4) Flower Pot. A shell (not the lifting charge) that explodes at or near the bottom of a mortar blowing a shower of stars and burning material into the air.

(5) Fountain. See Gerb.

(g) "G" Definitions.

(1) Gerb. (also known as a Fountain). A device that, when ignited, emits a shower of sparks into the air at various altitudes.

(2) Ground Spinning Device. Also known as a Ground Spinner. A pyrotechnic device that discharges sparks as it spins across the surface upon which it is placed.

(3) Ground Support Equipment. Non-flying equipment used to prepare and launch rockets, including but not limited to equipment for loading liquid propellants, loading pressurants, controlling vehicle systems, and commanding ignition.

(h) "H" Definitions.

(1) HDPE Mortar. Also known as a High-Density Polyethylene Mortar, is a mortar constructed of high-density polyethylene which is certified and labeled as meeting one or more of the following ASTM standards, which are hereby incorporated by reference: ASTM D 3350, or ASTM F 714.

(2) High Power Rocket. A rocket that (A) is constructed of paper, plastic, fiber-reinforced composite, rubber, aluminum or wood except that minor components such as screw eyes or motor mounts may be of other light-gauge metals; (B) is propelled by one or more high power rocket motors with a total impulse of less than 40,960 Newton-seconds (9209 lb.-seconds); (C) is propelled by a combination of model rocket motors having a total impulse of more than 320 N-sec (71.9 lb-sec); (D) is propelled by a combination of model rocket motors having more than a total of 125 g (4.4 oz) of propellant weight; or (E) weighs more than 1500 grams (53 ounces) with motor(s) installed. (Def. 80% out of NFPA 1127 3.3.13.1)

Commented [DR1]: This catches fiberglass, basalt, etc. too. (Technically, fiber-reinforced composites are plastics.)

Commented [DR2]: From NFPA 1127 §3.3.13.1.

(3) High Power Rocket Motor. A rocket motor that (A) is commercially manufactured, (B) CSFM approved, (C) is a solid or hybrid propellant rocket motor, (D) has a total impulse of less than 40,960 Newton-seconds (9209 lb.-seconds), (E) is rocket motors having more than a total of 125 g (4.4 oz) of propellant weight, and (F) has a total impulse of greater than 160 N-sec (36 lb-sec). (NFPA 1127.3.3.15.1)

(4) Hybrid Rocket Motor. A rocket motor that utilizes one propellant as a solid and the second propellant as a liquid or gas. (derived from NFPA 1127 3.3.15.2)

Commented [DR3]: From NFPA 1127 §3.3.15.2

(i) "I" Definitions.

(1) Ignitor. An electric, chemical or mechanical device used to initiate burning or pyrotechnic or propellant materials.

(2) Incidental Amount. A quantity of rocket pyrotechnic materials totaling not more than 100 lbs. of high-power (add or change to experimental?) rocket motor grains, 100 electric matches or

igniters, and 5 lbs. of black powder. (Consult with D.O.T. and Title 13, see BATF&E vs. Tripoli 2008 case 1.4 ruling)

(j) "J" Definitions. None.

(k) "K" Definitions. None.

(l) "L" Definitions.

- (1) Lance. A thin cardboard tube packed with a color-producing pyrotechnic composition.
- (2) License. "License" means any nontransferable authorization granted by the State Fire Marshal to engage in any activity regulated by this part.
- (3) Licensee. "Licensee" means any person 21 years of age or older holding a fireworks license issued pursuant to Chapter 5 (commencing with Section 12570), of the Health and Safety Code.
- (4) Loader. A person who places shells into mortars.
- (5) Low Burst or Low Break. The result of a shell exploding below its prescribed height.
- (6) Liquid Rocket Motor. A liquid rocket motor can be monopropellant or bipropellant. A monopropellant liquid rocket motor utilizes only one liquid propellant. A bipropellant liquid rocket motor utilizes two propellants, one propellant as a liquid and a second propellant as a liquid or gas. (Derived from NFPA 1127)

(m) "M" Definitions.

- (1) Magazine Tender. Person who distributes pyrotechnic items to the loader during the show.
- (2) Match. A fuse made of string or thread impregnated with black powder.
- (3) Meteoric Shower. A self-contained cardboard tube mounted on a plastic base emitting a shower of stars into the air.
- (4) Mines or Mine Bags. A device contained within a reusable or disposable tube, where upon ignition stars, firecrackers, salutes, whistles or other devices are propelled into the air, with the tube remaining on the ground.
- (5) Misfire. A pyrotechnic item which fails to function as designed after initiation. See also Dud.
- (6) Model Rocket Motor. A rocket motor that (A) is commercially manufactured, (B) is CSFM approved, (C) is a solid propellant rocket motor, (D) has a total impulse of less than 160 Newton-seconds (36 lb-sec), and (E) has a propellant weight of less than 125 g (4.4 oz). (NFPA 1127 3.3.15.3)
- (7) Monitor. Person responsible for watching for pyrotechnic items which do not perform properly.
- (8) Mortar. A cylinder that is used to hold and fire public display or special effects pyrotechnic items or compositions as defined in Section 999 of this subchapter.

(9) Mortar Box. Also known as a Trough. A portable wooden structure used for the placement of mortars.

(10) Mortar Rack. A wooden rack holding closely spaced HDPE or paper mortars. Mortar racks are limited to 10 tubes per individual rack.

(11) Multiple Break Shell. Aerial shell which has two or more breaks.

(12) Muzzle Burst. The process of an aerial shell breaking or bursting just as it leaves the mortar, scattering stars and burning material.

(13) Model Rocket. A rocket that (A) has structural parts made of paper, wood, and breakable plastic; (B) is propelled by one or more model rocket motors; (C) has a total impulse of less than 160 N-sec (36 lb-sec); (D) has a total propellant weight of less than 125 g (4.4 oz); and (E) weighs less than 1500 grams (53 ounces) with motor(s) installed. (hybrid of NFPA 1127 3.3.13.2 and CSFM FWX Handbook)

Commented [DR4]: From NFPA 1127 §3.3.13.1.

(n) "N" Definitions.

(1) N.F.P.A. The National Fire Protection Association.

(2) Non-metallic Mortar. See HDPE and Paper Mortar definition.

(o) "O" Definitions. None.

(p) "P" Definitions.

(1) Pan Type Mortar. A shallow metal container that is used to hold and fire special effect pyrotechnic compositions.

(2) Paper Mortar. A mortar constructed of spiral or convolute wound paper or chipboard.

(3) Party Popper. "Party Popper" also known by other names such as Champagne Party Poppers, Party Surprise Popper and Hot Shot Poppers, is a pyrotechnic device which contains less than 0.25 grain of pyrotechnic composition per unit load, designed to be held in the hand and when fired propels soft paper, cloth inserts or other similar fill material into the air. (4) Pigeons. Also known as line rockets. Pyrotechnic items using mechanical devices to control the effect of flight movement.

(5) Public Display of Fireworks. "Public display of fireworks" means an entertainment feature where the public or a private group is admitted or permitted to view the display or discharge of dangerous fireworks, as defined in Section 12505 of Health and Safety Code.

(6) 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 operation of such material contained within the rocket motor. (verbatim NFPA 1127 3.3.16)

Commented [DR5]: From NFPA 1127 §3.3.16.

(q) "Q" Definitions. None.

(r) "R" Definitions.

(1) Report. A detailed written account of all events involving pyrotechnic materials, devices, and operations in which a fire, injury, or death occurs, or in which any violation of the laws or regulations takes place.

(2) Retailer. Any person who, at a fixed place of business, sells, transfers, or gives fireworks to a consumer or user.

(3) 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. (verbatim NFPA 1127 3.3.13)

Commented [DR6]: From NFPA 1127, §3.3.13

(4) Rocket Engine. See Rocket Motor. (verbatim NFPA 1127 3.3.14)

(5) Rocket Launcher. A stable structure that provides rigid guidance, over a fixed distance, allowing the rocket to accelerate to a velocity that ensures stable flight once the rocket clears the end of the structure. This structure can be adjusted in both vertical launch angle and azimuth. (Hybrid of NFPA 1122 4.10, NFPA 1127 4.12 and CSFM FWX Handbook)

Commented [DR7]: See, e.g., NFPA 1122 §4.10, NFPA 1127 §4.12, TRA Safe Launch Practices (H)(1), NAR High Power Safety Code (7).

(6) Rocket Motor. A device that utilizes combustion of propellants to provide the force or thrust to cause a rocket to move. (verbatim NFPA 1125 3.3.24)

Commented [DR8]: From NFPA 1125, §3.3.24

(7) Rocket Pyrotechnic Material. Materials used to launch rockets or static fire rocket motors, including but not limited to solid rocket motors, solid rocket motor reloads or grains, rocket motor igniters, electric matches, black powder, tracking smoke grain, delay grain, parachute deployment charges, and parachute release charges.

(8) Roman Candle. A heavy paper or cardboard tube containing pellets of pyrotechnic composition which, when ignited, are expelled into the air at several-second intervals.

(s) "S" Definitions.

(1) Salute. An aerial shell as well as other pyrotechnic items whose primary effects are detonation and flash of light.

(2) Set Piece. Also known as ground display piece, mechanical piece. A pyrotechnic device or series of devices that while on the ground or elevated produces a visual and/or audible effect. These devices may employ fountains, roman candles, wheels, and lances.

(3) Shunt. A deliberate short-circuit of an electrically fired pyrotechnic device or a means contained within its firing system to protect it from accidental ignition by extraneous electricity.

(4) Single Break Shell. Aerial shell having one or more effects within a cylindrical or spherical casing.

(5) Snap Cap. Also known by other names such as, but not limited to, Snappers, Pop Pop Snappers, Fun Snaps and Bang Snaps. It is a pyrotechnic device that typically contains less than .20 grams, but shall not contain more than .25 grams, of gravel impregnated with not more than one milligram of pyrotechnic composition. Each unit consists of a small, roughly spherical paper parcel, approximately one-quarter (1/4) inch in diameter with a twisted paper tail. Each unit, when dropped against a hard surface, produces a small, toy cap-like report. Note: Studies are

conducted annually by the Office of State Fire Marshal which will determine whether or not there are adverse consequences from the regulation of snap caps.

(6) Soft Detonator. A detonator in which the explosive or pyrotechnic material is encased in a non-metallic container.

(7) Sparkler. A Stick or wire coated with a pyrotechnic composition that produces a shower of sparks upon ignition.

(8) Squib. See Electric Match. See also Detonator and Soft Detonator.

(9) Static Fire. An experimental test firing of a rocket or rocket motor, held immobile, to characterize the thrust of the rocket motor. (Copied from Experimental in FWX Handbook and moved up)

(10) Static Fire Test Stand. An immovable structure to which the rocket or rocket motor is affixed such that it will not work itself free during the firing process. (Copied from Experimental in FWX Handbook and moved up)

(11) Solid Rocket Motor. A rocket motor that utilizes propellant in solid form. The solid rocket motor may consist of one solid propellant grain for a single use rocket motor, or one of more solid-rocket-motor grains (reloads) for a reusable rocket motor. (Hybrid of NFPA 1125 3.3.24.7)

(10) Solid Rocket Motor Grain. Is the solid propellant in a solid rocket motor.

(11) Solid Rocket Motor Reload. A solid propellant as one grain or divided into two or more smaller grains for use in a reloadable rocket motor.

(12) Solid Rocket Motor Hardware. Hardware that makes up a solid rocket motor consists of but not limited to a nozzle, case, thermal lining, end-closure(s), and capable of holding one or more solid rocket motor reloads, tracking smoke grains, and parachute deployment charge.

(t) "T" Definitions.

(1) Travel. To move from point of ignition either vertically or horizontally.

(2) Trough. Also known as a Mortar Box. A portable wooden structure used for the placement of mortars.

(u) "U" Definitions. None.

(v) "V" Definitions. None.

(w) "W" Definitions.

(1) Wheel Driver. A heavy paper or cardboard tube emitting a shower of sparks from a very small orifice, similar to a propellant motor.

(2) Within This State. "Within this state" means all territory within the boundaries this state.

(x) "X" Definitions. None.

(y) "Y" Definitions. None.

Commented [DR9]: From NFPA 1125 §3.3.24.7

(z) "Z" Definitions. None.

### Article 3. Licenses

#### §981. General.

(a) No person shall engage in any type of fireworks activities without having submitted an application for and having obtained a license from the State Fire Marshal in accordance with the provisions of this chapter. Licenses shall be processed in accordance with Title 19, California Code of Regulations, Section 3.33.

Exceptions:

(1) Licensed Pyrotechnic Operators Basic Commercial, Restricted Commercial, ~~or Rockets-First Class, Rockets-Second Class, Rockets-Second Class Liquids, and Rockets-Third Class~~ may employ unlicensed assistants. Unlicensed assistants shall perform only when under the direct, immediate and constant supervision of the licensee when handling fireworks and pyrotechnic compositions.

(2) Licensed special effects and theatrical pyrotechnicians may employ unlicensed assistants. Unlicensed assistants shall perform only when under the direct, immediate and constant supervision of the licensee when handling fireworks and pyrotechnic compositions.

(3) A license shall not be required for the use or discharge of safe and sane fireworks.

Authority: Sections 12552, Health and Safety Code Reference: Sections 12552, Health and Safety Code

#### §981.3. License Fees.

(a) Every license fee required in accordance with this section shall be paid by check or money order made payable to the "CDF/State Fire Marshal."

(b) Every required fee shall be paid at or mailed to the office location designated by the State Fire Marshal.

(c) The original and annual renewal fee for a license shall be for the fiscal year or portion thereof beginning July 1 and ending June 30 of the following year, except that the fee for a Retail License shall be for the period of noon on the 28th of June through noon on the 6th of July, of the same calendar year.

(d) The original and annual renewal fees shall be as follows:

(1) Manufacturer \$1500.00

(2) Wholesaler \$3000.00

(3) Importer & Exporter \$4500.00

~~(3a) Limited Importer \$50.00~~ (Review and Research)

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- (4) Retailer \$50.00
- (5) Public Display (special) \$350.00
- (5a) Public Display (insert name. Rockets? Educational?) \$200.00
- (6) Public Display (limited) \$200.00
- (7) Public Display (general) \$1,500.00
- (8) Pyrotechnic Operator:
- Basic Commercial \$125.00
  - Restricted Commercial \$50.00
  - Rockets, 1st Class \$50.00
  - Rockets, 2nd Class (Solids) \$50.00
  - Rockets, 2nd Class (Liquids) \$50.00
  - Rockets, 3rd Class \$50.00
  - Special Effects, 1st Class \$250.00
  - Special Effects, 2nd Class \$200.00
  - Special Effects, 3rd Class \$100.00
  - Theatrical \$200.00
  - Theatrical Trainee \$100.00
  - Performer \$125.00
- (9) Manufacture, import, export, or wholesale, or any combination thereof; agricultural and wildlife fireworks \$500.00
- (10) Manufacture, import, export, or wholesale, or any combination thereof; model rocket motors \$500.00
- (11) Registration or classification fee for each model of emergency signaling device \$50.00
- (12) Party Popper/Snap Cap Distributor Permit \$750.00
- (13) Manufacture, import, export, wholesale, or any combination thereof high power or experimental high power rockets and motors \$1500.00
- (14) Retailer (high power rocket) \$500.00

(e) The original registration and classification fees shall be as follows:

- (1) Original registration and classification fee for each

Model of Model rocket motor, high power rocket or motor, safe and sane, party popper, snap caps/snappers, agricultural/wildlife or exempt fireworks \$50.00

(f) Required fees shall be submitted jointly with the appropriate application. Such fees are non-refundable once the license has been issued.

**§981.5. License Scope.**

(a) Model Rockets. A Model Rocket License authorizes the manufacture, import, export or wholesale or any combination thereof.

(b) Pyrotechnic Operator. A Pyrotechnic Operator's License authorizes and places the responsibility for the handling, supervision and discharge of any fireworks item or pyrotechnic device and establishes that the operator is responsible for the training of his or her assistants in the safe handling, supervision, and discharge of these items and devices, in accordance with the following:

(1) Pyrotechnic Operator--Unrestricted may conduct and take charge of all fireworks activities in connection with every kind of public fireworks display, whether commercial entertainment, experimental and other types of rockets, special effects in motion picture, theatrical and television production.

(2) Pyrotechnic Operator--Basic Commercial may conduct and is restricted to all fireworks activities in connection with a commercial fireworks public display, including the determination that all mortars, set pieces, rocket launchers and rockets are properly installed and that the proper safety precautions have been taken to insure the safety of persons and property. Such operator shall have charge of all activities directly related to handling, preparing and firing all fireworks at the public display, including the fixing of lifting charges and quick match as needed for aerial shells.

(4) Pyrotechnic Operator--Rockets First Class may conduct and is restricted to all activities in connection with research experiments, production, transportation, storage, propellant loading, static firing, and launching of all types of rockets and rocket motors. This operator may purchase and transport incidental amounts of rocket pyrotechnic materials. This operator may only purchase rocket pyrotechnic material from a licensed limited importer, importer, retailer, manufacturer, or wholesaler. Such operator shall also be responsible for the actions and conduct of all assistants. Operators licensed under subsection (b) are also required to obtain a local permit from the authority having jurisdiction prior to all launches.

(5) Pyrotechnic Operator--Rockets Second Class (Solids) may conduct and is restricted to all activities in connection with research experiments, production, transportation, storage, propellant loading, static firing, and launching of all types of solid propellant rockets and rocket motors, and high-power rockets and rocket motors. This operator may purchase and transport incidental amounts of rocket pyrotechnic materials. This operator may only purchase rocket pyrotechnic materials from a licensed limited importer, importer, retailer, manufacturer, or wholesaler. Such operator shall also be responsible for the actions and conduct of all assistants. Operators licensed under subsection (b) are also required to obtain a local permit from the authority having jurisdiction prior to all launches.

(6) Pyrotechnic Operator--Rockets Second Class (Liquids) may conduct and is restricted to all activities in connection with research experiments, production, transportation, storage,

propellant loading, static firing, and launching of all types of liquid and hybrid propellant experimental rockets and rocket motors, and high power rockets and rocket motors. This operator may purchase and transport incidental amounts of rocket pyrotechnic materials. This operator may only purchase rocket pyrotechnic materials from a licensed limited importer, importer, retailer, manufacturer, or wholesaler. Such operator shall also be responsible for the actions and conduct of all assistants. Operators licensed under subsection (b) are also required to obtain a local permit from the authority having jurisdiction prior to all launches.

(7) Pyrotechnic Operator—Rockets Third Class may purchase, transport, store, static firing, and launching high power rockets and motors. Experimental High-power rocket motors may only be imported, exported, and wholesaled by individuals or companies holding valid limited import, import, export, or wholesale licenses. This operator may purchase and transport incidental amounts of rocket pyrotechnic materials. This operator may only purchase rocket pyrotechnic materials from a licensed limited importer, importer, retailer, manufacturer, or wholesaler. Such operator shall also be responsible for the actions and conduct of all assistants. Operators licensed under subsection (b) are also required to obtain a local permit from the authority having jurisdiction prior to all launches.

(c) Separate License Not Required. A separate license shall not be required of licensed manufacturers, wholesalers, or importer-exporter to manufacture, wholesale, import or export agricultural and wildlife fireworks, high power rocket motors, or model rocket engines.

(d) Explosive Materials Not Included in Scope of License. The license scope as defined in this section is restricted to the use of materials defined as “fireworks” (as defined in Health and Safety Code Section 12511) and in no way confers authority for the use or discharge of explosive materials defined in Health and Safety Code Sections 12000, et seq.

(e) Limited Importer. A Limited Importer may import, transport, and sell an incidental amount of rocket pyrotechnic materials. A limited importer shall have a valid Pyrotechnic Operator—Rockets license.

Authority: Sections 12552 and 12580, Health and Safety Code

Reference: Sections 12630, 12631, and 12632, Health and Safety Code

## **Article 4. Permits**

### **§982. Local Permit, Application For.**

(a) When applying for a permit under Health and Safety Code section 12640(e), an applicant shall submit the following information and evidence to the authority having jurisdiction:

- (1) The name of the organization sponsoring the display, together with the names and license numbers of persons actually in charge of the display.
- (2) The date and time of day the display is to be held.
- (3) The exact location planned for the display.
- (4) The size and number of all fireworks to be discharged including the number of set pieces, shells, and other items. Shells shall be designated by diameter specifying single,

multiple break or salute.

(5) The manner and place of storage of all fireworks prior to, during, and after the display.

(6) Diagram of the grounds on which the display is to be held showing the point at which the fireworks are to be discharged, the location of all buildings, roads, and other means of transportation, the lines behind which the audience will be restrained, the location of all nearby trees, telegraph or telephone lines, or other overhead obstruction.

(7) Proof that satisfactory workers' compensation insurance is carried for all employees in compliance with Labor Code Section 3700.

(8) If the permit is for a public display or special effects, documentary proof of conformance with sections 12610 and 12611, Health and Safety Code.

(9) A State Fire Marshal's license for the public display of fireworks, under Health and Safety Code Sections 12575, 12576, or 12577. No permit for a public display of any type shall be granted unless a public display license general, special, or limited has been first obtained from the State Fire Marshal.

(10) The name and license number of the wholesaler who supplied all items used in the display.

(b) Permittee shall be responsible for compliance with the provisions under which a public display permit has been granted.

## **Article 5. Qualifications-Examination and Investigation**

### **§984. General.**

(a) Test and Examination. Every applicant for a pyrotechnic operator's license shall take and pass a written examination administered by the State Fire Marshal in accordance with the provisions of this chapter. The applicant shall submit evidence attesting to the qualifications and experience required by this Article for the type of license for which application has been submitted.

(1) Pyrotechnic Operator--Unrestricted shall require a minimum amount of experience as indicated for each of the following types of licenses. Such experience shall be in the actual discharge of fireworks and pyrotechnic devices for the types indicated.

(A) Pyrotechnic Operator--Basic Commercial 2 years.

(B) Pyrotechnic Operator--Rockets First Class 2 years.

(C) Pyrotechnic Operator--Special Effects First Class 2 years. Under the provisions of this section, not less than 6 years total experience is required.

(2) Pyrotechnic Operator--Basic Commercial shall require a minimum of 2 years of active work as an unlicensed assistant to either a licensed Pyrotechnic Operator-Unrestricted, or Basic

Commercial. This time requirement may be reduced by 1 year through the successful completion of a State Fire Marshal approved training course or through exceptional work experience as evidenced by log entries or work records. Notwithstanding the 2 year requirement, the applicant shall have participated in the firing of not less than 8 different public displays.

(3) Pyrotechnic Operator--Special Effects First Class shall require a minimum of 2 years of active work as a Pyrotechnic Operator--Special Effects Second Class. This time requirement may be reduced by 1 year through the successful completion of a State Fire Marshal approved training course or through exceptional work experience as evidenced by log entries or work records.

(4) Pyrotechnic Operator--Special Effects Second Class shall require a minimum of 2 years of active work as a Pyrotechnic Operator--Special Effects Third Class. This time requirement may be reduced by 1 year through the successful completion of a State Fire Marshal approved training course or through exceptional work experience as evidenced by log entries or work records.

(5) Pyrotechnic Operator--Special Effects Third Class. No experience required.

(6) Pyrotechnic Operator--Theatrical shall require a minimum of 2 years of active work as a Pyrotechnic Operator--Theatrical Trainee. This time requirement may be reduced by 1 year through the successful completion of a State Fire Marshal approved training course or through exceptional work experience as evidenced by log entries or work records.

(7) Pyrotechnic Operator--Theatrical Trainee. No experience required.

(8) Pyrotechnic Operator Performer. No experience required.

(9) Pyrotechnic Operator--Rockets 1<sup>st</sup> Class meets the experience and training required for both Rockets 2nd Class (Solids) and Rockets 2nd Class (Liquids).

(10) Pyrotechnic Operator--Rockets 2nd Class (Liquids) requires a minimum of 1 year of experience and training building, static firing, and launching experimental liquid or hybrid rockets and rocket motors.

(11) Pyrotechnic Operator--Rockets 2nd Class (Solids) requires a minimum of 1 year of experience and training building, static firing, and launching experimental solid rockets and rocket motors.

(12) Pyrotechnic Operator--Rockets 3rd Class shall require a minimum of 1 year of experience and training building and launching high power rockets.

(b) Qualifications. Adequate qualification for the issuance of the requested license shall be determined by the State Fire Marshal. It shall be incumbent upon the applicant to present to the State Fire Marshal evidence of such qualifications which may include a physical demonstration of knowledge and ability.

(c) Experience. The required experience for issuance of a pyrotechnic operator's license shall be in accordance with this section. In addition, applications shall be accompanied by the names and complete addresses of not less than five persons as reference who are not a relative, and who can attest to the applicant's experience, integrity ~~and~~ or training. At least one of These references shall be licensed pyrotechnic operators of a class equal to or greater than the class applied for and shall have been

licensed for at least one year. (Alternate to letters with exceptional work experience, see theatrical language)

Authority: Section 12552, Health and Safety Code

Reference: Sections 12552, 12580, 12603 and 12607, Health and Safety Code

**§984.1. Examinations.** The written examination required for pyrotechnic operators shall consist of at least three parts, one pertaining to laws relating to fireworks, one pertaining to regulations relating to fireworks and one relating to the practices and procedures of the license scope.

Authority: Section 12552, Health and Safety Code

Reference: Sections 12552 and 12580, Health and Safety Code

**§984.2. Examination Process.**

(a) To satisfactorily pass the written examination, the applicant must obtain a minimum grade of seventy percent (70%) in each part.

(b) Every person taking an examination for pyrotechnic operator shall have the right to contest the validity of individual questions of such examination.

(c) Every objection as to the validity of individual questions of an examination shall be made in writing within 5 days after taking said examination. Objections shall state the reasons for each objection.

(d) The decision made by the State Fire Marshal and the action taken shall be reflected in all future examinations but shall not affect the grades established in past examinations.

(e) The decision as to the action to be taken on the submitted objection(s) shall be by the State Fire Marshal and such decision shall be final.

(f) Any applicant failing the examination may reapply and take another examination not less than 15 days from the date of the previous examination.

(g) Applicants applying to take repeat examination shall file a new application. An additional fee is not required in those instances where the applicant has taken a test and failed it.

(h) The State Fire Marshal may require a reexamination of any licensee. The examination may be of any type permitted by these regulations. A fee shall not be required for a reexamination.

(i) Any applicant found using any extrinsic aids during the examination shall automatically fail the examination, and shall forfeit admission to future examinations for a period of one year.

Authority: Section 12552, Health and Safety Code

Reference: Sections 12552, 12580, 12589, Health and Safety Code

**984.3. Application Period.** An original pyrotechnic operator's license shall not be issued for the month of June of any fiscal year unless the application has been received in the Office of the State Fire Marshal on or before the preceding May 15.

Authority Section: 12552, Health and Safety Code

Reference Section: 12552, 12580, 12589, 12595, 12597, Health and Safety Code

**984.4. Investigation and Letters of Reference.** Applicants for a pyrotechnic operator's license are subject to an investigation by the State Fire Marshal. The investigation is intended to determine, but will not be limited to, compliance with state laws and regulations, and competency of applicant to perform in a safe manner. To assist in this investigation five letters of reference in conformance with Section 984(c) shall be submitted with this application. Additionally, a review of the applicant's log or journal detailing the kind of materials used, the quantity, how fired, date, time and location, and name and license number of the supervising pyrotechnician shall be conducted.

Authority: Section 12552, Health and Safety Code

Reference: Sections 12552, 12580, 12587, 12590, 12615 Health and Safety Code

**984.5. Renewal Applications.** Application for renewal of a license shall be made by the person to whom the license was issued. ~~In all cases, applicants for license renewal shall pass an examination as required for an original application in accordance with the provisions of this chapter every four years.~~

Authority: Section 12552, Health and Safety Code Reference: Section 12552, Health and Safety Code

**§992. Electric Firing Circuits, General.** Connecting any electric firing circuit to any power supply, is prohibited until all special effects devices, fireworks, rockets, and pyrotechnics in the sequence are connected to firing leads and the firing area is clear of all unauthorized personnel. Exception: Circuit testing as described in section 992.3.

Authority: Sections 12552 and 12553, Health and Safety Code Reference: Sections 12532 and 12552, Health and Safety Code

**§992.1. Power Sources.** Power sources for firing special effects devices, fireworks, rockets, and pyrotechnics shall be restricted to batteries or individually isolated, ungrounded generators used for firing purposes only. Commercial or house power may be used provided the firing system is electrically isolated from the commercial or house power through the use of such items as isolation transformers. Under no condition may commercial or house power be used directly for firing purposes.

Authority: Sections 12552 and 12553, Health and Safety Code Reference: Sections 12532 and 12552, Health and Safety Code

**§992.2. Firing Systems Safeguards.** All firing systems, including battery and power circuit types, shall be designed to insure against accidental firing by providing a shunt or other control method in which no firing power may be applied to any firing circuits unless the operator intentionally enables or arms the firing system before applying firing power.

Authority: Sections 12552, 12553, Health and Safety Code Reference: Sections 12532, 12552, Health and Safety Code

**§992.3. Circuit Tests.** All electrically fired pyrotechnic circuits shall be tested with a galvanometer or other test device in which the test current is not capable of firing the pyrotechnic device being tested.

Authority: Sections 12552, 12553, Health and Safety Code Reference: Sections 12532, 12552, Health and Safety Code

**§992.4. Sight Firing.** Special effects devices, rockets, and pyrotechnics shall not be fired unless the area involved with the firing is in the continuously unobstructed full view of the pyrotechnic operator or his/her assistant at the time of firing.

Authority: Sections 12552, 12553, Health and Safety Code Reference: Sections 12532, 12552, Health and Safety Code

## **Article 15. Public Display**

### **§993. Insurance.**

(a) Any person, firm, or corporation applying for a public display license shall furnish to the State Fire Marshal a policy of public liability and property damage insurance. The policy may have a deductible not to exceed fifteen thousand dollars (\$15,000). The policy shall provide limits of bodily injury and property damage liability of not less than one million dollars (\$1,000,000.00) combined single limits for each occurrence annually as payment for damages to persons or property which may result from or be caused by such public display of fireworks, or any negligence on the part of the licensee or his or its agents, servants, employees, or subcontractors presenting such public display.

Exception: A deductible in excess of fifteen thousand dollars (\$15,000) may be permitted provided a security deposit, such as, but not limited to a surety bond, pledge of assets or bank letter of credit covering the value of the excess, is approved by the State Fire Marshal.

(b) The certificate of insurance shall provide all of the following:

(1) That the insurer will not cancel the insured's coverage without 15 days prior written notice to the State Fire Marshal.

(2) That the duly licensed pyrotechnic operator required by law to supervise and discharge the public display, acting either as an employee of the insured or as an independent contractor and the State of California, its officers, agents, employees, and servants are included as additional insurers, but only insofar as any operations under this chapter are concerned.

(3) That the State shall not be responsible for any premium or assessments on the policy.

Authority: Section 12552, Health and Safety Code Reference: Section 12552, Health and Safety Code

### **§993.1. Reports.**

General public display and special public display licensees shall report to the State Fire Marshal prior to date of each display all public displays of fireworks contemplated under their license. Licensee must report to the State Fire Marshal at least 72 hours prior to each display on state-owned or state-occupied property. Applicants for limited public display licenses shall report at the time of applying for their license. The report shall contain the information set forth in Section 982.

**Exception:** A general public display licensee conducting special effects activities for motion picture, television, and theatrical productions need not comply with any of the above reporting requirements.

## **Article 16. Experimental Rockets/Unlimited**



**§1010. General.** ~~This article applies to all experimental rockets, except approved model rockets as defined in Article 14 and experimental high power rockets and experimental high power rocket motors as defined in Article 2.~~

Authority: Section 12552 Health and Safety Code  
Reference: Section 12552 Health and Safety Code

**§1011. ~~Launch Test~~ Areas.**

(a) Experimental rockets ~~unlimited~~ shall not be launched within this State from any site other than test areas approved for such purpose by the fire authority having jurisdiction.

(b) These ~~test launch~~ areas shall meet the following minimum requirements:

(1) ~~Test Launch~~ areas shall consist of a launching site and an impact ~~range area~~.

(2) The launching site is that area immediately surrounding the launching devices, including positions to protect all personnel.

(3) ~~The launching site with the area immediately surrounding the rocket launcher shall be cleared of all flammable objects prior to the launch.~~

(4) The impact ~~range area~~ is that area over which rockets may travel by design or accident and upon which they fall. Its length should be not less than the maximum calculated ideal ballistic range of any rocket to be fired from its launching site and extends as the radius of a circular section 90° from the launching site apex into the prevailing wind.

(5) The launching site shall not be in a grain field, dry grass, brush or forest covered lands.

(6) The impact area shall not contain high voltage electrical lines or ~~major highways~~.

(c) ~~Test-Launch~~ areas should not include ~~no~~ dwellings or structures other than those provided for operating and non-operating personnel protection and loading rockets.

(d) Operating personnel protection shall consist of an ~~unprotected control center placed at a minimum safe distance per table 18A or a protected control center which is a~~ bunker, blockhouse or similar protection designed to withstand shrapnel and mass impact equal to the potential created by the heaviest rocket intended to be fired and falling from its zenith or exploding at any point. This ~~bunker control center~~ when located not less than 50 feet distant from the launching device shall afford minimum protection equal to a 2-foot-wide slit trench not less than 5 feet deep and parapet observation ports with protection equal to a double thickness of sand bags. Overhead protection should consist of substantial structural materials, and these materials shall be covered to afford protection equivalent to that of a double layer of filled sandbags. Non-operating personnel minimum protection when located not less than 250 feet distant from the launching device shall consist of construction at least equal to the slit trench shelter described above.

(e) Rocket ~~solid propellant~~ loading facilities shall be housed in a lightly constructed and covered structure located not less than 100 feet distant from any other structure including any or launching device.

**Commented [DR10]:** ATFE defines a "major" highway in terms of cars-per-hour in 27 CFR 555.

**Commented [DR11]:** This intentionally echoes the wording in the launching of High Power Rockets section.

(f) Within this State, all ~~fuel or~~ propellant compounding or loading of experimental ~~fuelled~~ rockets ~~unlimited~~ shall be performed by licensed pyrotechnic operators or by experienced persons directly supervised by these pyrotechnic operators.

Authority: Section 12552, Health and Safety Code Reference: Section 12552, Health and Safety Code

**§1011.1 Static Firing Areas.**

(a) Experimental rockets and rocket motors shall not be static fired within this State from any site other than test areas approved for such purpose by the fire authority having jurisdiction.

(b) These static test areas shall meet the following minimum requirements:

(1) The static firing test site is that area immediately surrounding the static fired devices, including positions to protect all personnel.

(2) The exhaust path of the motor and the area immediately surrounding the static fired device shall be cleared of all flammable objects prior to its firing.

(c) Test areas should include no dwellings or structures other than those provided for operating and non-operating personnel protection and loading rockets.

(d) Operating personnel protection shall consist of an unprotected control center placed at a minimum safe distance per table 18B or a protected control center which is a bunker, blockhouse or similar protection designed to withstand direct and falling shrapnel created by the static test stand or rocket exploding. This control center when located not less than 50 feet distant from the static firing device shall afford minimum protection equal to a 2-foot-wide slit trench not less than 5 feet deep and parapet observation ports with protection equal to a double thickness of sandbags. Overhead protection should consist of flame resistant, substantial structural materials, and these materials shall be covered to afford protection equivalent to that of a double layer of filled sandbags. Non-operating personnel minimum protection when located not less than 250 feet distant from the static firing device shall consist of construction at least equal to the slit trench shelter described above.

(e) Rocket solid propellant loading facilities shall be housed in a lightly constructed and covered structure located not less than 100 feet distant from any other structure or any launching device.

(f) Within this State, all propellant compounding or loading of experimental rockets shall be performed by licensed pyrotechnic operators or by experienced persons directly supervised by these pyrotechnic operators.

(g) The rocket or rocket motor shall be affixed to a testing device that is an immovable structure in such a manner that the rocket or motor will not work itself free during the testing or the experimentation process.

Authority: Section 12552, Health and Safety Code Reference: Section 12552, Health and Safety Code

**§1012. Rocket Launchers.** Rocket launchers shall have a minimum length, sufficient to insure stabilization to any rocket fired from them and shall be constructed of appropriate material such as metal or rigid flame-resistant plastic and designed for the specific intended purpose and use. Special protection shall be provided for persons setting and arming all rockets. The use of any two rail, "V" or

"U" trough launcher, which depends solely on gravity to control the rocket during launching is prohibited.

Authority: Section 12552, Health and Safety Code Reference: Section 12552, Health and Safety Code

**§1013. Setting Rocket Launchers.** All adjustments and alignments of the rocket launcher and connections shall be completed before the rocket is armed. Final rocket launcher adjustments shall be checked by the licensed pyrotechnic operator in charge.

Authority: Section 12552 Health and Safety Code Reference: Section 12552, Health and Safety Code

**§1014. Firing Procedure.** A definite ordered firing procedure shall be established by the licensed pyrotechnic operator in charge. Both visible and audible signals shall be used to alert all persons in the test area. Any launch or firing code used shall be reduced to writing and posted conspicuously in the test area.

Authority: Section 12552 Health and Safety Code Reference: Section 12552 Health and Safety Code

**§1015. Launching Rockets.**

(a) Rockets may not be armed or launched except by an experienced pyrotechnic operator, who, if he or she is not licensed, shall be directly responsible to the licensed pyrotechnic operator in charge. The actual arming operation shall be accomplished by a competent person. During all arming operations all personnel shall take shelter when launching, excepting only the individual arming the rocket and his or her necessary assistants. All internal self-contained firing circuits (within the rocket) including, but not by way of limitation, multiple stage ignition, parachute releases, bursting parachute deployment charges, etc., shall be provided with an arming and disarming device operable remotely from without the assembled rocket in the launching position.

(b) The firing circuit shall be shunted at both the control center and the launching site by the pyrotechnic operator assigned to arm the rocket. Both shunts shall be in place and he or she shall test them to ensure that the firing circuit is effectively short-circuited, before the rocket is set in the launching position.

(c) The single special key, which removes the launching site shunt from the firing circuit, shall be the sole means for competing the firing circuit at the control center. The arming operator shall retain the shunt key in his or her personal possession from the time the circuit is initially shunted until the arming operations are completed and he or she removes the last shunt in the control center and establishes a ready firing circuit.

(d) No other means or device than a remotely controlled electric circuit of an approved design may be used to launch single stage rockets or the first stage of multistage rockets.

(e) A launch angle of not more than twenty degrees (20°) from the vertical shall be used.

(f) Surface wind at the launch site shall not exceed twenty miles per hour (20 m.p.h.), and visibility above the launching area shall be at least five thousand feet (5,000 ft.).

(g) Recovery devices ejected from the rocket during the launch flight sequence, shall be of flame-retardant materials meeting the standards of Title 19, California Code of Regulations, Chapter 8, Sections 1171 through 1355.

(h) Experimental rockets shall be launched only during daylight hours unless specifically approved by the authority having jurisdiction.

Authority: Health and Safety Code Section 12552 Reference: Health and Safety Code Section 12552

**§1016 Static Firing.**

(a) Rockets or rocket motors may not be static fired except by an experienced pyrotechnic operator, who, if he or she is not licensed, shall be directly responsible to the licensed pyrotechnic operator in charge. The actual arming operation shall be accomplished by a competent person. During all firing operations all personnel shall take shelter when static firing, excepting only the individual arming the rocket and his or her necessary assistants. The ignition firing circuit shall be provided with an arming and disarming device operable remotely from the rocket or rocket motor when in the static firing position.

(b) The ignition firing circuit shall be shunted at both the control center and the static firing stand by the pyrotechnic operator assigned to fire the rocket motor or rocket. Both shunts shall be in place and he or she shall test them to ensure that the ignition firing circuit is effectively short-circuited, before inserting the igniter into the rocket motor.

(c) The single special key, which removes the static firing site shunt from the firing circuit, shall be the sole means for competing the firing circuit at the control center. The arming operator shall retain the shunt key in his or her personal possession from the time the circuit is initially shunted until the operations are completed and he or she removes the last shunt in the control center and establishes a ready firing circuit.

(d) No other means or device than a remotely controlled electric circuit may be used to ignite and fire a rocket or rocket motor.

Authority: Health and Safety Code Section 12552 Reference: Health and Safety Code Section 12552

**§1017 Pressurization.**

(a) Applies to experimental rockets and rocket motors that are hybrid or liquid propellant only.

(b) A rocket for launch, or a rocket or rocket motor for static firing, may not be pressurized except by an Class One or Class Two (Liquid) pyrotechnic operator, who, if he or she is not licensed, shall be directly responsible to the licensed pyrotechnic operator in charge.

(c) During all pressurization operations, all personnel shall take shelter.

(d) All pressurization operations, using the ground support equipment or within the rocket or static firing stand, shall be provided with pressurization and depressurization devices remotely operated by electrical means from the control center.

(e) All pressurization operations, using the ground support equipment or the rocket or static firing stand, shall be provided with pressure monitoring devices remotely read by electrical means from the control center.

(f) For a launch or a static firing, abort or misfire; the rocket or static firing test stand shall be depressurized before personnel leave shelter and approach the launcher or static firing test stand.

(g) All pressure bottles or tanks must have an adequate pressure relief valve or device.

Authority: Health and Safety Code Section 12552 Reference: Health and Safety Code Section 12552

### **Article 17. Model Rockets**

**§1020. General.** Nothing in this article is intended to regulate the sale or the construction of model rockets, provided that such model rockets are not equipped with a model rocket motor. Authority: Section 12552 Health and Safety Code Reference: Sections 12552, Health and Safety Code

**§1021. Classification and Labeling.**

(a) All types of model rocket motors shall be submitted to the State Fire Marshal by a licensed model rocket motor manufacturer, importer/exporter, or wholesaler for classification. A copy of a certificate of classification indicating the item has been classified as a model rocket motor by a laboratory approved by the Department of Transportation shall accompany the request for classification by the State Fire Marshal. Three samples of each motor type shall be submitted to the State Fire Marshal for classification. Standards for the classification for model rocket motors shall conform to the National Fire Protection Association (N.F.P.A.) 1122 (1987), Code for Unmanned Rockets, Sections 3-1.1, 3-1.2, 31.3, 3-1.4, 3-1.5, 3-1.6, 3-1.7, 3-1.8, 3-1.9, 3-1.10.

(b) Individual engines shall bear the California State Fire Marshal seal and the registration number of the licensee. Authority: Section 12552 Health and Safety Code Reference: Section 12552, 12560, 12565, Health and Safety Code

**§1022. Model Rocket Standards and Use.**

(a) Model rocket standards and use shall comply with NFPA 1122, the Code for Unmanned Rockets, Chapter 3, Sections 3-1.1 through 3-1.10, Chapter 4, Chapter 5, Chapter 6, and Appendix A-2-(1987), which is incorporated by reference herein except for Appendices A-2.3 and A-2.4. Authority: Section 12552 Health and Safety Code Reference: Section 1255 Health and Safety Code

**§1023. Storage and Sale.** No model rocket motors shall be stored, sold or offered for sale at retail unless such model rocket motors have been classified by the California State Fire Marshal.

Authority: Section 12552 Health and Safety Code Reference: Section 12552, Health and Safety Code

**§1024 Restrictions.** The provisions of this article shall not be used to establish the authority to possess, launch or use experimental ~~unlimited~~ or ~~experimental~~/high powered rocket motors.

Authority: Section 12552 Health and Safety Code Reference: Section 12552, Health and Safety Code

**§1025. Authorization.**

(a) No model rocket user shall launch any model rocket from any site without first securing authorization from the authority having jurisdiction. The authority having jurisdiction may require notification each time that model rockets are to be launched.

(b) It shall be the responsibility of the model rocket user to secure permission of the owner of private lands when such land is intended to be used to launch model rockets.

Authority: Section 12552, Health and Safety Code Reference: Section 12552, Health and Safety Code

**§1026. Revocation of Permits and Authorized Use of Launching Area.** The authority having jurisdiction may immediately revoke a permit to sell model rocket motors at retail if it is found that those persons granted a permit have violated these regulations. The authority having jurisdiction may immediately revoke its authorization to use a firing area if it is found that an undue hazard exists, including, but not limited to, fire safety hazards or life safety hazards. Authority: Section 12552, Health and Safety Code Reference: Section 12552, Health and Safety Code

**§1027. Minimum Age.**

(a) No model rocket motors shall be sold, given, or delivered to any person under 18 years of age.

EXCEPTIONS:

(1) Model rocket motors bearing the standardized coding 1/4A, 1/2A, A, B, C, and D may be sold, given, or delivered to any person 14 years of age or older.

(2) Persons who are 12 years of age or older and who are taking part in a model rocket education program may receive model rocket motors and launch approved model rockets motors when under the direct supervision and control of a person 18 years of age or older. Model rocket motors must be obtained only from the adult in charge of the launching.

Approved model rocket motors for this exception shall bear the motor coding 1/4A, 1/2A, A, B, C or D.

Authority: Section 12552, Health and Safety Code Reference: Section 12552, Health and Safety Code

**§1028. Supervision.** The permittee shall be responsible for the safety of all spectators and other persons connected with the launching of model rockets.

Authority: Section 12552, Health and Safety Code Reference: Section 12552, Health and Safety Code

## Article 18. ~~Experimental~~ High Power Rockets and Motors

**§1030. General.** This article is intended to regulate the sale, storage, ~~construction~~ and use of ~~experimental~~ high power rocket motors and ~~experimental construction of~~ high power rockets.

Authority: Section 12552 Health and Safety Code

Reference: Section 12552, Health and Safety Code

### §1031. Classification and Labeling.

(a) High power rocket motors ~~manufactured by a licensed high power rocket motor manufacturer shall be certified by a recognized testing organization to meet the requirements set forth in N.F.P.A. 1125, "Code for the Manufacture of Model Rocket and High Power Rocket Motors" and shall be~~ submitted by the manufacturer, importer/exporter, or wholesaler to the State Fire Marshal for classification.

(b) All ~~classified~~ motors shall bear the State Fire Marshal seal and the registration number of the licensee. Classified motors contained within packages may have the State Fire Marshal seal and registration number on the package, provided that such packages are sealed.

Authority: Section 12552, Health and Safety Code

Reference: Section 12552, Health and Safety Code, [N.F.P.A. 1125 Section 8](#)

### §1032. ~~Experimental~~ High Power Rocket Motor Standards and Use.

(a) The maximum total impulse per ~~high power rocket~~ shall not exceed ~~40,960~~ Newton-seconds (~~9,209~~ lb.-seconds).

~~(2) When more than one rocket motor is utilized, the combined total impulse shall not exceed 20,480 Newton-seconds (4604.4 lb.-seconds).~~

~~(2) Commercially manufactured solid or hybrid propellant.~~

(b) ~~If an experimental~~ High-power rockets ~~is equipped with an experimental high-power rocket motor, then the rocket shall be constructed to meet the requirements set forth in N.F.P.A. 1127, "Code for High Power Rocketry"~~ and shall:

(1) be constructed of paper, plastic, ~~fiber-reinforced composite~~, rubber, aluminum or wood except that minor components such as screw eyes or motor mounts may be of other light-gauge metals; and

(2) include an effective means or device for returning the rocket safely to the ground without causing personal injury or property damage; and

(3) The rocket shall not contain any type of explosive or pyrotechnic warhead of any type.

(c) ~~An experimental~~ high power rocket shall not be used as a weapon.

Authority: Section 12552, Health and Safety Code

Reference: Section 12552, Health and Safety Code, [N.F.P.A. 1127 Section 4](#)

**§1033. License Required.** No person shall possess, receive, transport, store, or launch any ~~experimental~~ high power rocket motor without first securing a valid license as a Pyrotechnic Operator--

**Commented [DR12]:** From NFPA 1127, §3.3.3. Currently, NFPA "recognized testing organizations" include TRA, NAR, and CAR.

Alternate wording: "...shall meet the requirements set forth in N.F.P.A. 1125" (if commercial certification isn't desired)

**Commented [DR13]:** We need to clarify this, lest we accidentally ensnare Experimental Motors in the "all motors shall bear the State Fire Marshal seal" requirement.

**Commented [DR14]:** If desired; this reference has more details on certification and manufacturing requirements.

**Commented [DR15]:** From FAR 101.22(b) and NFPA 1127.

**Commented [DR16]:** The requirements exceed those listed here, so we could potentially strike (1)-(3).

**Commented [DR17]:** This catches fiberglass, basalt, etc. too. (Technically, fiber-reinforced composites are plastics.)

**Commented [DR18]:** Additional reference for vehicle requirements.

Rockets First, Second (~~Solid~~), ~~Second (Liquid)~~, or Third Class from the State Fire Marshal. No person shall sell a ~~experimental~~ high power rocket motor to any person unless the seller possesses a valid license as a ~~limited importer~~, wholesaler, or retailer under this chapter.

Authority: Section 12552 Health and Safety Code

Reference: Section 12552 Health and Safety Code

**§1034. Local Permit Required--Seller.** No person shall sell a ~~experimental~~ high power rocket motor without first securing a permit from the authority having jurisdiction. This permit shall be in addition to, not in lieu of, a valid license issued by the State Fire Marshal for the sale of these motors. This permit shall be deemed separate from a local permit allowing the launching of rockets utilizing such motors.

Authority: Section 12552, Health and Safety Code

Reference: Section 12552, Health and Safety Code

**§1035. Local Permit Required--Launch.**

(a) No ~~experimental~~ high power rocket motor user shall launch ~~any experimental~~ high power rocket ~~motor~~ from any site without first securing a permit from the authority having jurisdiction.

(b) The authority having jurisdiction may require notification by the permittee each time a ~~an experimental~~ high power rocket ~~motor~~ is to be launched. It shall be the responsibility of the ~~experimental~~ high power rocket motor user to also secure the permission of the owner of private land when such land is intended to be used as a launch site.

Authority: Section 12552, Health and Safety Code

Reference: Section 12552, Health and Safety Code

**§1036. Launching Facilities.**

(a) ~~Experimental~~ High power rockets ~~motors~~ shall be launched from platforms meeting the following specifications:

(1) A ~~rocket launching device~~ shall be used to restrict the ~~horizontal rocket to linear~~ motion until flight velocity sufficient to maintain stability during flight is achieved.

(2) A launch angle of not more than twenty degrees (20°) from the vertical shall be used.

(b) ~~High power rocket motor~~ launching shall be by remote electrical means only, and under the supervision and control of an individual properly licensed in accordance with this chapter.

(c) Surface wind at the launch site shall not exceed twenty miles per hour (20 m.p.h.), and ~~airspace~~ above the launching area shall ~~permit horizontal visibility of at least five miles with obscuring phenomena of less than five-tenths coverage~~.

(d) The recovery device wadding ejected from the rocket during the launch flight sequence, if used, shall be of flame retardant material meeting the standards of Title 19, California Code of Regulations, Chapter 8, Sections 1171 through 1355.

(e) ~~Experimental~~ High power rockets ~~motors~~ shall be launched only during daylight hours unless specifically approved by the authority having jurisdiction.

**Commented [DR19]:** In accordance with 14 CFR 101.25(a) and (b). (The old requirement was "5000 feet" which is very arbitrary.)



(f) All personnel, including those conducting the actual launching of the experimental-high power rocket motor(s), shall maintain a clear radial distance from the launch platform during the countdown and launch, pursuant to the guidelines in Table 18A, or take shelter in a control center meeting the requirements of Section 1011(d).

**TABLE 18A  
REQUIRED LAUNCH DISTANCES**

TOTAL IMPULSE OF ROCKET (in Newton Seconds)*	RADIAL DISTANCE FROM LAUNCHER
0—320	100 feet
320.01—1280	150 feet
1280.01—2560	200 feet
2560.01—5120	300 feet
5120.01—10240	500 feet
10240.01—20480	1000 feet
20480.01—40960	1500 feet

**Commented [DR20]:** Increased from 30 feet. New distance meets requirement in NFPA 1127. (NFPA 1127 Table 4.16.3 is identical, if a citation is preferred.)

\*Rockets propelled by more than one motor shall use the distance specified for the next higher impulse category.

Authority: Section 12552, Health and Safety Code  
Reference: Section 12552, Health and Safety Code

**§1037. Launch Site Standards.**

(a) The launch site shall consist of a launching area and a recovery area. The launching area shall consist of an area surrounding the launching devices a radial distance from the launching device as specified in Table 18A above. The recovery area shall consist of the launching area and the minimum area necessary to retrieve the rocket, based on the estimated altitude likely to be achieved by the rocket. These calculations shall take into account the weight of the rocket and the specific type of motor used (or combined total impulse). Table 18B shall be used to determine the minimum launch site dimensions for the various classes of experimental-high power rockets.

(b) The launch site shall not be located in any grain field, dry grass, brush or forest covered lands.

(c) The launch site shall not contain any buildings or structures, unless specifically approved in advance by the authority having jurisdiction, and under no circumstances shall such buildings or structures be less than one thousand five hundred feet (1,500 ft.) from the launch site.

(d) The launch site shall not contain any high voltage electrical lines or major highways.

(e) The launch site shall not contain any natural or artificially constructed obstacle deemed by the authority having jurisdiction to pose a hazard during launching.

(f) The launching area shall be located as near as possible to the center of the launch site but in no case less than seven hundred fifty feet (750 ft.) from the boundary of the launch site.

(g) The launching area shall have appropriate barriers around it such that spectators will be restrained from encroaching upon it. These barriers may be of any type approved by the authority having jurisdiction.

Authority: Section 12552, Health and Safety Code  
Reference: Section 12552, Health and Safety Code

**TABLE 18B**  
**MINIMUM EXPERIMENTAL HIGH POWER**  
**ROCKET MOTOR LAUNCH SITE STANDARDS**

Equivalent Motor Type	Max. Combined Total Impulse (N-Seconds)	Min. Launch Site Dimensions (feet)
H	320	1,500
I	640	2,500
J	1,280	3,500
K	2,560	5,000
L	5,120	7000
M	10,240	10,000
N	20,480	15,000
<u>O</u>	<u>40,960</u>	<u>15,000</u>

Authority: Section 12552, Health and Safety Code  
Reference: Section 12552, Health and Safety Code

**§1038. Testing.** At locations approved by the authority having jurisdiction, experimental high power rocket motors may be ignited on the ground for the purpose of determining their performance. All of the following procedures shall be followed during the firing of these motors:

- (a) The experimental high power rocket motor shall be affixed to a testing device or to an immovable structure in such a manner that the motor will not work itself free during the testing or the experimentation process.
- (b) The experimental high power rocket motor shall be ignited only by remotely operated electrical means fully under the control and supervision of the licensed pyrotechnic operator conducting the testing or experimentation.
- (c) The exhaust path of the motor shall be cleared of all flammable objects prior to its firing.
- (d) All persons, whether they are conducting, participating in or observing the testing or experiment, shall stand away from the motor, and particularly its exhaust path, at all times during the test or experiment.
- (e) Under no circumstances shall testing or experimentation involving experimental high power rocket motors be conducted indoors.

Authority: Section 12552 Health and Safety Code  
Reference: Section 12552, Health and Safety Code

**§1039. Supervision and Responsibility.** The licensed pyrotechnic operator in charge of the launch site or test site shall supervise the arming of every experimental high power rocket motor, the launching of all motors, and the disposal of all unwanted or defective motors. The licensed pyrotechnic operator shall also be responsible for the safety of all spectators or observers and all other persons connected with the launching of experimental high power rocket motors.

**Commented [DR21]:** We may want to cite 14 CFR 101.25(g) for this, which says the launch site must be the greater of:

- (1) Not less than one-quarter the maximum expected altitude or
- (2) 1,500 feet

which, for all intents and purposes, increases the site dimension requirements and is less arbitrary than the numbers in the table since it depends on the actual flight altitude.

Authority: Section 12552 Health and Safety Code  
Reference: Section 12552, Health and Safety Code

**EXCERPTS FROM NFPA 1122 (see what year this language is and if there are any changes since then in the 2018 edition. Be sure to cite the year)**

**The following information is incorporated by reference from N.F.P.A. 1122 (20xx version).**

### **CHAPTER 3 Definitions**

3.1 General. The definitions contained in this chapter shall apply to the terms used in this code. Where terms are not included, common usage of the terms shall apply.

3.2 NFPA Official Definitions.

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

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

3.2.3\* 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.

3.2.4 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.

3.2.5\* 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 appropriate designated standards or has been tested and found suitable for a specified purpose.

3.2.6 Shall. Indicates a mandatory requirement.

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

3.3 General Definitions.

3.3.1 Certified Motor. A commercially manufactured rocket motor that has been certified by a recognized testing organization acceptable to the authority having jurisdiction to meet the certification requirements set forth in NFPA 1125, Code for the Manufacture of Model Rocket and High Power Rocket Motors.

3.3.2 Commercial Manufacturer. Any individual, firm, partnership, joint venture, corporation, or other business entity engaged 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.

3.3.3 High Power Rocket. A rocket that (1) is propelled by one or more high power rocket motors; (2) is propelled by a combination of model rocket motors having an installed total impulse of more than 320 N-sec (71.9 lb-sec); (3) is propelled by a combination of model rocket motors having more than a total of 125 g (4.4 oz) of propellant weight; or (4) weighs more than 1500 g (53 oz) with motor(s) installed.

3.3.4 High Power Rocket Motor. A rocket motor that has more than 160 N-sec (36 lb-sec) but no more than 40,960 N-sec (9208 lbs-sec) of total impulse or an average thrust greater than 80 N (18 lbf) or more than 62.5 g (2.2 oz) of propellant, and that otherwise meets the other requirements set forth in NFPA 1125, Code for the Manufacture of Model Rocket and High Power Rocket Motors.

3.3.5 Installed Total Impulse. The combined total impulse of all rocket motors installed in a rocket and intended to be ignited during the launch and flight of the rocket.

3.3.6\* Model Rocket. A rocket that (1) weighs no more than 1500 g (53 oz) with motors installed; and (2) is propelled by one or more model rocket motors having an installed total impulse of no more than 320 N-sec (71.9 lb-sec); and (3) contains no more than a total of 125 g (4.4 oz) of propellant weight.

3.3.7 Model Rocket Engine. See 3.3.8, Model Rocket Motor.

3.3.8\* Model Rocket Motor. A rocket motor that has a total impulse of no greater than 160 N-sec (36 lb-sec), an average thrust of no greater than 80 N (18 lbf), and a propellant weight of no greater than 62.5 g (2.2 oz), and that otherwise meets the other requirements set forth in NFPA 1125, Code for the Manufacture of Model Rocket and High Power Rocket Motors.

3.3.9 Module. A pyrotechnic component of a reloadable model rocket motor in which the chemical composition is loaded into a finished assembly by the manufacturer.

3.3.10\* Motor Reloading Kit. A product manufactured by a commercial manufacturer that contains the components and parts used to reload and reuse a reloadable rocket motor casing.

3.3.11 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 operation of such material contained within the rocket motor.

3.3.12 Rocket. A device that ascends into the air without the use of aerodynamic lifting forces acting against gravity and that is propelled by one or more rocket motor(s).

3.3.13 Rocket Engine. See

3.3.14, Rocket Motor.

3.3.14\* Rocket Motor. A device containing propellant that provides the force or thrust to cause a rocket to move.

3.3.14.1 Reloadable Rocket Motor. A rocket motor that has been 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.

3.3.14.2 Solid Propellant Rocket Motor. A rocket motor that contains a fuel and an oxidizer in solid form and whose force or thrust is produced by the combustion of the fuel and oxidizer.

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

#### CHAPTER 4 Requirements for Model Rocket Construction, Operation, and Motor Storage

4.1\* Model Rocket Operations. A model rocket shall comply with the requirements of construction and operation as set forth in 14 CFR 101.1 through 101.25, "Federal Aviation Administration Regulations."

4.2 Model Rocket Materials.

4.2.1 A model rocket's structural parts, including the body, nose cone, and fins, shall be made of paper, wood, or plastic and shall contain no metal parts.

4.2.2 A model rocket motor casing that is metallic, reloadable, and meets the specifications in this code shall be permitted.

4.2.3 A model rocket motor shall be assembled with all pyrotechnic ingredients preloaded into a cylindrical paper or similarly constructed nonmetallic tube that does not fragment into sharp, hard pieces.

4.3\* Model Rocket Recovery.

4.3.1 A model rocket shall have a means for returning it to the ground (for example, a parachute) so it can be flown again.

4.3.2 All recovery wadding used in a model rocket shall be flame resistant.

4.4\* Model Rocket Weight Limits.

4.4.1 A model rocket shall weigh no more than 453 g (16 oz) at lift-off, including propellant.

4.4.2 A model rocket shall use no more than 113 g (4 oz) of propellant, unless one of the following is met:

(1)\* A model rocket that weighs in excess of 453 g (16 oz) but not more than 1500 g (53 oz), including propellant, shall be permitted if the Federal Aviation Administration notice requirements are met. (2) A model rocket that uses more than 113 g (4 oz) but less than or equal to 125 g (4.4 oz) of propellant, shall be permitted if the Federal Aviation Administration notice requirements are met.

4.5 Model Rocket Power Limits. A model rocket's installed motor(s) shall produce a total impulse of no more than 320 N-sec (72 lb-sec).

4.6 Model Rocket Payloads. A model rocket shall not carry a payload that is designed to be flammable, explosive, or harmful to persons or property.

4.7 Model Rocket Flight Paths. A model rocket shall not be launched on a flight path aimed at a target.

4.8 Model Rocket Launch Site. A model rocket shall be launched outdoors in a cleared area, free of tall trees, power lines, buildings, and dry brush and grass.

4.9 Model Rocket Launch Site Size. The launch site shall be at least as large as specified in Table 4.9.

Table 4.9 Minimum Launch Site Dimensions

Installed Total Impulse (N-sec) Equivalent Motor Type

Minimum Site Dimension

m	ft	0 – 1.25	A and A 15	50	1.26 – 2.50	A 30	100	2.51 – 5.00	B 61	200	5.01 – 10.00	C
122	400	10.01 – 20.00	D 152	500	20.01 – 40.00	E 305	1000	40.01 – 80.00	F 305	1000		
80.01 – 160.00	2F (or 1G)	305	1000	160.01 – 320.00	4F (or 2G)	457	1500					

4.9.1 For a circular area, the minimum launch site dimension shall be the diameter, and for a rectangular area it shall be the shortest side.

4.9.2 A model rocket with an installed total propellant weight exceeding 113 g (4 oz) but less than or equal to 125 g (4.4 oz) shall comply with the additional operating notice requirements as set forth in 14 CFR 101.3 through 101.25, "Federal Aviation Administration Regulations." 4.9.3 Type G motors with an installed total impulse of more than 80 N-sec (18 lb-sec), but not more than 160 N-sec (36 lb-sec), shall be permitted to be used by individuals 18 years old and older. 4.9.4 As an alternative to the minimum launch site dimensions of Table 4.9, the size of the launch site shall meet one of the following criteria:

- (1) It shall be not less than one-half the maximum altitude as stated by the manufacturer for the model rocket and motor(s) combination being flown.
- (2) It shall be of a size approved by the authority having jurisdiction based on flight demonstration or data required to substantiate the anticipated altitude.

4.10 Model Rocket Launchers. A model rocket shall be launched from a stable launch device that provides rigid guidance until it has reached a speed adequate to ensure a safe flight path.

4.11 Model Rocket Launcher Eye Safety.

4.11.1 To prevent accidental eye injury, the launcher shall be placed so the end of the rod is above eye level, or the end shall be capped when approaching it.

4.11.2 The launch rod shall be capped or disassembled when not in use and shall not be stored in an upright position.

4.12 Model Rocket Launch Safety.

4.12.1 The launcher shall have a blast deflector device to prevent the motor exhaust from hitting the ground directly.

4.12.2 The area around a launch device shall be cleared of brown grass, dry weeds, or other easy-to-burn materials.

4.13 Model Rocket Ignition System.

4.13.1 The system used to launch a model rocket shall be remotely controlled and electrically operated.

4.13.2 The system shall have a launching switch that returns to the "off" position when released. 4.13.3 The system shall be equipped with a removable safety interlock in series with the launch switch.

#### 4.14 Spectator Distances.

4.14.1 All persons shall remain at least 4.6 m (15 ft) from the model rocket during ignition of a model rocket motor with an installed total impulse of 30 N-sec (6.7 lb-sec) or less.

4.14.2 All persons shall remain at least 9 m (30 ft) from the model rocket during ignition of a model rocket motor with an installed total impulse of more than 30 N-sec (6.7 lb-sec).

#### 4.15 Spectator Notification.

4.15.1 All people in the launch area shall be made aware of the pending model rocket launch.

4.15.2 An audible 5-second countdown to launch shall take place.

4.16 Model Rocket Misfires. If a model rocket misfires, no person shall approach the launcher until 1 minute has elapsed and the safety interlock has been removed or the battery has been disconnected from the ignition system.

#### 4.17 Model Rocket Launch Conditions.

4.17.1 A model rocket shall not be launched in a wind of more than 32 km/h (20 mph).

4.17.2 A model rocket shall not be launched into a cloud.

4.17.3 A model rocket shall not be launched near an aircraft in flight.

4.17.4 A model rocket shall not be launched at an angle greater than 30 degrees from vertical.

4.18\* Model Rocket Retrieval Safety. No attempt shall be made to retrieve a model rocket from a power line or other life-threatening area.

#### 4.19 Model Rocket Motor Requirements.

4.19.1 Only commercially manufactured, certified model rocket motors or motor reloading kits or components as specified in NFPA 1125, Code for the Manufacture of Model Rocket and High Power Rocket Motors, shall be used.

4.19.2 No person shall dismantle, reload, or alter a single-use model rocket motor.

4.19.3 No person shall alter the components of a reloadable model rocket motor or use the contents of a reloadable rocket motor reloading kit for a purpose other than those specified by the manufacturer's instructions for the reloadable rocket motor or reloading kit.

#### 4.20 Residential Storage of Model Rocket Motors and Motor Components.

4.20.1 Not more than 23 kg (50 lb) net weight of solid propellant model rocket motors, motor reloading kits, or motor components shall be stored at a residence.

4.20.2 Not more than 11 kg (25 lb) net weight of solid propellant model rocket motors, motor reloading kits, or motor components stored at a residence shall be permitted to be stored in the living quarters.

4.20.3 Provisions for the storage of more than 23 kg (50 lb) net weight of solid propellant model rocket motors, motor reloading kits, or motor components at a residence shall be subject to the approval of the authority having jurisdiction.

#### CHAPTER 5 Prohibited Activities

5.1 Prohibited Activities. The following activities shall be prohibited by this code:

- (1) Using model rocket motors, motor reloading kits, or components for the primary purpose of producing a spectacular display of color, light, sound, or any combination thereof
- (2) Using a model rocket or model rocket motor, motor reloading kit, or component as a weapon
- (3) Using a model rocket, model rocket motor, motor reloading kit, or component contrary to the instructions for its use
- (4) Tampering with any model rocket motor or motor reloading kit or component in any manner or to any degree that is contrary to the purpose for which the model rocket motor, motor reloading kit, or component is designed and intended to be used
- (5) Making, operating, launching, flying, testing, activating, discharging, or other experimentation with model rocket motors, motor reloading kits, or motor components that have not been certified in accordance with NFPA 1125, Code for the Manufacture of Model Rocket and High Power Rocket Motors
- (6) Selling, offering for sale, exposing for sale, purchasing, making, or using fuse, wick, or other ignition devices intended to be activated by a handheld flame for the purpose of starting or igniting a model rocket motor
- (7) Exhibiting statements in writing, in advertising, or on packaging that certification in accordance with NFPA 1125, Code for the Manufacture of Model Rocket and High Power Rocket Motors, has been obtained, when such certification has not been obtained, has been withdrawn, or has been denied
- (8) Reloading any expendable solid propellant model rocket motor with any material after that motor has been operated
- (9) Reloading any reloadable model rocket motor with any material or by any means not specifically provided or recommended by the manufacturer
- (10) Purchasing or using by persons 17 years old or younger of Type G model rocket motors that do not meet the specifications of 16 CFR 1500.85(8) and (9), "Consumer Product Safety Commission Regulations."
- (11) Purchasing or using by persons 17 years old or younger of reloadable model rocket motors or motor reloading kits that do not meet the specifications of 16 CFR 1500.85(8) and (9), "Consumer Product Safety Commission Regulations."

ANNEX A EXPLANATORY MATERIAL Annex A is not a part of the requirements of this NFPA document but is included for informational purposes only. This annex contains explanatory material, numbered to correspond with the applicable text paragraphs.



A.3.2.1 Approved. The National Fire Protection Association does not approve, inspect, or certify any installations, procedures, equipment, or materials; nor does it approve or evaluate testing laboratories. In determining the acceptability of installations, procedures, equipment, or materials, the authority having jurisdiction may base acceptance on compliance with NFPA or other appropriate standards. In the absence of such standards, said authority may require evidence of proper installation, procedure, or use. The authority having jurisdiction may also refer to the listings or labeling practices of an organization that is concerned with product evaluations and is thus in a position to determine compliance with appropriate standards for the current production of listed items.

A.3.2.2 Authority Having Jurisdiction (AHJ). The phrase “authority having jurisdiction,” or its acronym AHJ, is used in NFPA documents in a broad manner, since jurisdictions and approval agencies vary, as do their responsibilities. Where public safety is primary, the authority having jurisdiction may be a federal, state, local, or other regional department or individual such as a fire chief; fire marshal; chief of a fire prevention bureau, labor department, or health department; building official; electrical inspector; or others having statutory authority. For insurance purposes, an insurance inspection department, rating bureau, or other insurance company representative may be the authority having jurisdiction. In many circumstances, the property owner or his or her designated agent assumes the role of the authority having jurisdiction; at government installations, the commanding officer or departmental official may be the authority having jurisdiction.

A.3.2.3 Code. The decision to designate a standard as a “code” is based on such factors as the size and scope of the document, its intended use and form of adoption, and whether it contains substantial enforcement and administrative provisions.

A.3.2.5 Listed. The means for identifying listed equipment may vary for each organization concerned with product evaluation; some organizations do not recognize equipment as listed unless it is also labeled. The authority having jurisdiction should utilize the system employed by the listing organization to identify a listed product.

A.3.3.6 Model Rocket. A model rocket has structural parts made of paper, wood, and breakable plastic; it has a means for its return to the ground so it can be flown again; and its primary use is for purposes of education, recreation, and sporting competition.

A.3.3.8 Model Rocket Motor. Where the term model rocket motor is used in this code, it includes both assembled, reloadable model rocket motors and manufactured, expendable model rocket motors.

A.3.3.10 Motor Reloading Kit. The components and parts normally include a propellant module(s), a new model rocket motor nozzle, new insulation components, prepackaged delay and ejection modules, an electrical igniter, and the parts necessary to seal the casing during operation.

A.3.3.14 Rocket Motor. The force or thrust is created by the discharge of gas generated by combustion, decomposition, change of state, or other operation of materials contained, carried, or stored solely within the rocket motor or rocket and not dependent on the outside environment for reaction mass.

A.4.1 The following is an excerpt from 14 CFR 101.1, “Federal Aviation Administration Regulations”: (a) This part prescribes rules governing the operation in the United States of the following:

(1) (2) (3) Any unmanned rocket except: (i) Aerial fireworks displays; and, (ii) Model rockets: (a) Using not more than four ounces of propellant; (b) Using a slow-burning propellant; (c) Made of

paper, wood, or breakable plastic, containing no substantial metal parts, and weighing not more than 16 ounces, including the propellant; and (d) Operated in a manner that does not create a hazard to persons, property, or other aircraft.

A.4.3 Models should be launched only during daylight hours.

A.4.4 A model rocket should weigh no more than the motor manufacturer's recommended maximum lift-off weight for the motors used or should use motors recommended by the kit manufacturer.

A.4.4.2(1) See 14 CFR 101.1 through 101.25, "Federal Aviation Administration Regulations."

A.4.18 It is recommended that, if a model rocket becomes entangled in a power line, the utility company or other appropriate authority be notified.

ANNEX B MODEL ROCKET SAFETY CODE OF THE NATIONAL ASSOCIATION OF ROCKETRY This annex is not a part of the requirements of this NFPA document but is included for informational purposes only.

B.1 The Model Rocket Safety Code provides guidance applicable to activities involving model rockets for education, recreation, and sporting competition. The National Association of Rocketry also publishes an annotated version of the Model Rocket Safety Code.

(1) Materials. I will use only lightweight, non-metal parts for the nose, body, and fins of my rocket.

(2) 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.

(3) 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.

(4) 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.

(5) 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 4.6 m (15 ft) away when I launch rockets with D motors or smaller, and 9.1 m (30 ft) 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.

(6) 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.

(7) Size. My model rocket will not weigh more than 1500 grams (53 ounces) at liftoff and will not contain more than 125 grams (4.4 ounces) of propellant or 320 N-sec (71.9 lbs) of total impulse. If my model rocket weighs more than one point (453 grams) at liftoff or has more than 4 ounces (113 grams) of propellant, I will check and comply with Federal Aviation Administration regulations before flying.

(8) 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.

(9) Launch Site. I will launch my rocket outdoors, in an open area at least as large as shown in Table B.1, and in safe weather conditions with wind speeds no greater than 20 miles per hour. I will ensure that there is no dry grass close to the launch pad and that the launch site does not present risk of grass fires.

(10) 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.

(11) Recovery Safety. I will not attempt to recover my rocket from power lines, tall trees, and other dangerous places.

Table B.1 Launch Site Dimensions

Installed Total Impulse (N-sec) Equivalent Motor Types

Minimum Site Dimensions (ft)	0.00 - 1.25	A, A	50	1.26 - 2.50	A	100	2.51 - 5.00	B	200	5.01 - 10.00	C	400	10.01 - 20.00	D	500	20.01 - 40.00	E	1,000	40.01 - 80.00	F	1,000	80.01 - 160.00	G	1,000	160.01 - 320.00	Two Gs	1,500
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ANNEX C GLOSSARY This annex is not a part of the requirements of this NFPA document but is included for informational

C.1 Aero Model. A miniature, unmanned flying device that includes the category of model rocket as defined in 3.3.6.

C.2 Skyrocket or Rockets with Sticks. Fireworks rockets not intended for re-use that meet the definition of skyrocket or missile-type rocket in the hazardous materials regulations of 49 CFR 172 and 173, "Department of Transportation Regulations." Fireworks rockets approved for transportation by DOT normally are classed as Fireworks UN 0335, Explosive 1.3G (formerly Class B Explosive, Special Fireworks) or Fireworks UN 0336, Explosive 1.4G (formerly Class C Explosive, Common Fireworks), depending on the quantity of pyrotechnic composition contained in the rocket. Skyrockets use a wooden stick for flight guidance and stability, while missile-type rockets use fins.

#### ANNEX E INFORMATIONAL REFERENCES

E.1 Referenced Publications. The following documents or portions thereof are referenced within this code for informational purposes only and are thus not part of the requirements of this document unless also listed in Chapter 2.

E.1.1 NFPA Publications. (Reserved)

E.1.2 Other Publications.

E.1.2.1 NAR Publications. National Association of Rocketry, P.O. Box 177, 1311 Edgewood Drive, Altoona, WI 54720. Model Rocket Safety Code of the National Association of Rocketry, 2001. List of Certified Model Rocket Motors. E.1.2.2 TRA Publication. Tripoli Rocketry Association, P.O. Box 970010, Orem, UT 84097. List of Certified Model Rocket Motors.

E.1.2.3 U.S. Government Publications. U.S. Government Printing Office, Washington, DC 20402. Title 14, Code of Federal Regulations, Parts 101.1–101.25, “Federal Aviation Administration Regulations.” Title 49, Code of Federal Regulations, Parts 172–173, “Department of Transportation Regulations.”

E.2 Informational References. (Reserved)

E.3 References for Extracts. (Reserved)

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