NFPA®

1122

Code for Model Rocketry

2018

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NFPA® 1122

Code for

Model Rocketry

2018 Edition

This edition of NFPA 1122, *Code for Model Rocketry*, was prepared by the Technical Committee on Pyrotechnics. It was issued by the Standards Council on October 10, 2016, with an effective date of October 30, 2016, and supersedes all previous editions.

This edition of NFPA 1122 was approved as an American National Standard on October 30, 2016.

Origin and Development of NFPA 1122

NFPA 1122 was originally created as a tentative code by the Technical Committee on Pyrotechnics as NFPA 41L, *Code for Model Rocketry*. It was adopted tentatively in May 1967 and adopted officially by the Association in May 1968. In November 1976, a major revision of NFPA 41L, including its redesignation as NFPA1122 L, *Code for Unmanned Rockets*, was adopted.

The 1976 edition was revised by the Technical Committee on Pyrotechnics in 1980 to eliminate the "L" designation and to delete the requirements for cold-propellant model rocket motors, which are no longer allowed because of their use of chlorofluorocarbons (Freon 12™). Other technical changes were made at that time. Those revisions were adopted at the 1981 NFPA Fall Meeting, and the new document became the 1982 edition. Amendments to the 1982 edition were processed at the 1986 NFPA Fall Meeting, resulting in the 1987 edition. Because of the rapid progress in consumer rocket technology and the emergence of the commercial space transportation industry, the 1987 edition was amended, and its title was changed back to NFPA 1122, *Code for Model Rocketry*, for the 1994 edition.

For the 1997 edition, the terminology and provisions relating to reloadable solid-propellant model rockets and reloadable solid-propellant model rocket motors were incorporated into the document for consistency with changes made to federal regulations that affected the model rocketry industry. The changes in federal regulations, which occurred after the previous edition of this code had been adopted, were reflected throughout the document.

In addition, the citations for federal regulations were updated throughout the document to reflect changes made to those regulations since the previous edition of the Code had been prepared.

Other changes were editorial in nature to bring the document into compliance with NFPA style.

The 2002 edition included a new edition of the National Association of Model Rocketry's *Model Rocket Safety Code*. Other changes included the deletion of material covered by NFPA 1125, *Code for the Manufacture of Model Rocket and High Power Rocket Motors*, that was no longer needed in NFPA 1122. The code also was revised to comply with the *Manual of Style for NFPA Technical Committee Documents*.

The 2008 edition incorporated minor revisions to the standard; several definitions were amended to comply with the *NFPA Glossary of Terms*.

The 2013 edition provided updates to federal regulation citations and references. The definitions for *model rocket motor* and *high power rocket motor* were revised to more clearly distinguish them from each other. Weight limits for model rockets were modified in accordance with new FAA regulations. Safe spectator distances were established for simultaneous launches of more than 10 rockets.

The 2018 edition includes a change that allows another option for calculating the minimum launch site dimensions for original rocket designs or rocket kits, which cannot normally be obtained by manufacturers. This change permits a consumer to accurately calculate the altitude that any rocket will attain with any motor and allows the consumer to obtain an estimate of the flight altitude that is subsequently used for determining minimum launch site dimensions. The 2018 edition also contains an update in Annex B to the National Association of Rocketry's *Model Rocket Safety Code* to the current 2012 edition.

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

Committee Scope: This Committee shall have primary responsibility for documents on the manufacture, transportation, and storage of consumer and display fireworks, pyrotechnic special effects, and model and high power rocket motors. This Committee shall have primary responsibility for documents on the use of display fireworks and for model and high power rocketry, and the construction, launching, and other operations that involve model and high power rocket motors. This Committee does not have responsibility for documents on the retail sales and associated storage of consumer fireworks nor on the use of consumer fireworks by the general public; on the use of pyrotechnic special effects before a proximate audience; nor on the manufacture, transportation, storage for use of military, automotive, agricultural, and industrial pyrotechnics.

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

A reference in brackets [ ] following a section or paragraph indicates material that has been extracted from another NFPA document. As an aid to the user, the complete title and edition of the source documents for extracts in mandatory sections of the document are given in Chapter 2 and those for extracts in informational sections are given in Annex E. Extracted text may be edited for consistency and style and may include the revision of internal paragraph references and other references as appropriate. Requests for interpretations or revisions of extracted text shall be sent to the technical committee responsible for the source document.

Information on referenced publications can be found in Chapter 2 and Annex E.

Chapter 1 Administration

1.1 Scope.

1.1.1 This code shall apply to the design, construction, limitation of rocket propellant mass and power, and reliability of model rocket motors and model rocket motor reloading kits and their components, produced commercially for sale to or for use by the public for purposes of education, recreation, and sporting competition.

1.1.2 This code also shall apply to the design and construction of model rockets propelled by model rocket motors specified in 1.1.1.

1.1.3 This code also shall apply to the conduct of launch operations of model rockets specified in 1.1.2.

1.1.4 This code shall not apply to the design, construction, production, manufacture, fabrication, maintenance, launch, flight, test, operation, use, or other activity that is connected with a rocket or rocket motor where carried out or engaged in by any of the following:

(1) National, state, or local government
(2) Individual, firm, partnership, joint venture, corporation, or other business entity engaged as a licensed business in the research, development, production, testing, maintenance, or supply of rockets, rocket motors, rocket propellant chemicals, or rocket components or parts
(3) Colleges or universities

1.1.5 This code shall not apply to the design, construction, fabrication, maintenance, production, manufacture, launch, flight, test, operation, or use of rocket-propelled model aircraft that sustain their mass against the force of gravity by aerodynamic lifting surfaces that support the aircraft during the entire duration of its flight in the air, but it shall apply to the model rocket motors and their components that provide the propulsion for such model aircraft.

1.1.6 This code shall not apply to fireworks rockets or pyrotechnic rockets as defined in NFPA 1123.

1.1.7 This code shall not apply to NFPA 1124.

1.1.8 This code shall not apply to NFPA 1126.

1.1.9 This code shall not apply to high power rocketry as defined in NFPA 1127.

1.2 Purpose.

1.2.1 The purpose of this code shall be to ensure the availability of commercial model rocket motors and components that meet standards of safety and reliability to ensure that the creative and experimental use of model rocket devices by the public is reasonably safe.

1.2.2 The purpose of this code also shall be to discourage the making and launching of homemade rockets and other rocket-like vehicles propelled by, or intended to be propelled by, homemade rocket-propulsion devices.

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

1.3 Enforcement. This code shall be administered and enforced by the authority having jurisdiction (AHJ) designated by the governing authority. *(See Annex D for sample wording for enabling legislation.)*

Chapter 2 Referenced Publications

2.1 General. The documents or portions thereof listed in this chapter are referenced within this code and shall be considered part of the requirements of this document.

2.2 NFPA Publications. National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.

NFPA 1123, *Code for Fireworks Display,* 2014 edition.

NFPA 1124, *Code for the Manufacture, Transportation, Storage, and Retail Sales of Fireworks and Pyrotechnic Articles,* 2017 edition.

NFPA 1125, *Code for the Manufacture of Model Rocket and High Power Rocket Motors,* 2017 edition.

NFPA 1126, *Standard for the Use of Pyrotechnics Before a Proximate Audience,* 2016 edition.

NFPA 1127, *Code for High Power Rocketry,* 2018 edition.

2.3 Other Publications.

2.3.1 U.S. Government Publications. U.S. Government Publishing Office, 732 North Capitol Street, NW, Washington, DC 20401-0001.

Title 14, Code of Federal Regulations, Chapter 1, Subchapter F, Part 101, Subparts A and C, "Federal Aviation Administration Regulations."

Title 16, Code of Federal Regulations, Part 1500.85(8) and (9), "Consumer Product Safety Commission Regulations."

2.3.2 Other Publications.

Merriam-Webster's Collegiate Dictionary, 11th edition, Merriam-Webster, Inc., Springfield, MA, 2003.

2.4 References for Extracts in Mandatory Sections.

NFPA 1125, *Code for the Manufacture of Model Rocket and High Power Rocket Motors,* 2017 edition.

NFPA 1127, *Code for High Power Rocketry,* 2018 edition.

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 defined in this chapter or within another chapter, they shall be defined using their ordinarily accepted meanings within the context in which they are used. *Merriam-Webster's Collegiate Dictionary*, 11th edition, shall be the source for the ordinarily accepted meaning.

3.2 NFPA Official Definitions.

3.2.1* Approved. Acceptable to the authority having jurisdiction.

3.2.2* Authority Having Jurisdiction (AHJ). An organization, office, or individual responsible for enforcing the requirements of a code or standard, or 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 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.

3.3.2 Engine.

3.3.2.1 ***Model Rocket Engine.*** See 3.3.5.2.2, Model Rocket Motor.

3.3.2.2 ***Rocket Engine.*** See 3.3.5.2, Rocket Motor.

3.3.3 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.

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

3.3.5 Motor.

3.3.5.1 ***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.

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

3.3.5.2.1 ***High Power Rocket Motor.*** A rocket motor that has no more than 40,960 N-sec (9209 lb-sec) of total impulse, and that does not otherwise meet all the requirements for a model rocket motor set forth in NFPA 1125. [**1125,** 2017]

3.3.5.2.2* ***Model Rocket Motor.*** A solid propellant 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 that otherwise meets the other requirements set forth in NFPA 1125. [**1125,** 2017]

3.3.5.2.3 ***Reloadable Rocket Motor.*** A rocket motor that has been designed and manufactured so that the user can load, reload, and reuse the pressure-containing body or casing using the parts and components of a motor-reloading kit. [**1125,** 2017]

3.3.5.2.4 ***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.

3.3.6* 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.

3.3.7 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).

3.3.7.1 ***High Power Rocket.*** A rocket vehicle that (1) is propelled by one or more high power rocket motors; or (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); or (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. [**1127,** 2018]

3.3.7.2* ***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.

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

3.3.9 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 101.1–101.29, "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.

4.3* Model Rocket Recovery.

4.3.1 A model rocket shall have a means for returning it to the ground (for example, a parachute) so that 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 1500 g (53 oz) at lift-off, including rocket propellant.

4.4.2 A model rocket shall use no more than 125 g (4.4 oz) of rocket propellant.

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 (71.9 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.

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

4.9.2 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 of age and older.

4.9.3 As an alternative to the minimum launch site dimensions of Table 4.9, the size of the launch site shall be permitted to meet one of the following criteria:

(1) It shall be not less than one-half the maximum altitude as stated by the manufacturer or as calculated by flight simulation for the model rocket and motor(s) combination being flown.
(2) It shall be of a size approved by the AHJ 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.

Table 4.9 Minimum Launch Site Dimensions

Installed Total Impulse (N-sec)	Equivalent Motor Type	Minimum Site Dimension*	
		m	ft
0–1.25	¼ A and ½ 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

*See 4.9.1.

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).

4.14.3 Mass Launches. When more than 10 rockets are being launched simultaneously, the minimum spectator distance shall be set to 1.5 times the highest altitude expected to be reached by any of the rockets, and one or more spotters shall be positioned to monitor the potential landing area to restrict unauthorized entry and to identify and report hazards.

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 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 AHJ.

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
(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 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 of age 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 of age 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.3.3.5.2 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.3.3.5.2.2 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.3.3.6 Motor Reloading Kit. The components and parts normally include a rocket 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.3.3.7.2 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.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.4.18 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 unless specifically adopted by the jurisdiction.

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

B.2 Code. The following text is the *Model Rocket Safety Code* in its entirety.

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. When conducting a simultaneous launch of more than ten rockets I will observe a safe distance of 1.5 times the maximum expected altitude of any launched rocket.

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 g (53 oz) at liftoff and will not contain more than 125 g (4.4 oz) of propellant or 320 N-sec (71.9 lb-sec) of total impulse.

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.2, and in safe weather conditions with wind speeds no greater than 32.22 km/h (20 mph). 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, or other dangerous places.

Table B.2 Launch Site Dimensions

Installed Total Impulse (N-sec)	Equivalent Motor Type	Minimum Site Dimensions (ft)
0.00–1.25	¼ A, ½ 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	1000
40.01–80.00	F	1000
80.01–160.00	G	1000
160.01–320.00	2Gs	1500

Source: National Association of Rocketry.

Annex C Glossary

This annex is not a part of the requirements of this NFPA document but is included for informational purposes only.

C.1 Aero Model. A miniature, unmanned flying device that includes the category of *model rocket* as defined in 3.3.7.2.

C.2 Skyrockets 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 172–173, "Department of Transportation Regulations." Fireworks rockets approved for transportation by the Department of Transportation (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 D Sample Ordinance Adopting NFPA 1122

This annex is not a part of the requirements of this NFPA document but is included for informational purposes only.

D.1 The following sample ordinance is provided to assist a jurisdiction in the adoption of this code and is not part of this code.

ORDINANCE NO. _____

An ordinance of the *[jurisdiction]* adopting the *[year]* edition of NFPA *[document number]*, *[complete document title]*, and documents listed in Chapter 2 of that *[code, standard]*; prescribing regulations governing conditions hazardous to life and property from fire or explosion; providing for the issuance of permits and collection of fees; repealing Ordinance No. _____ of the *[jurisdiction]* and all other ordinances and parts of ordinances in conflict therewith; providing a penalty; providing a severability clause; and providing for publication; and providing an effective date.

BE IT ORDAINED BY THE *[governing body]* OF THE *[jurisdiction]*:

SECTION 1 That the *[complete document title]* and documents adopted by Chapter 2, three (3) copies of which are on file and are open to inspection by the public in the office of the *[jurisdiction's keeper of records]* of the *[jurisdiction]*, are hereby adopted and incorporated into this ordinance as fully as if set out at length herein, and from the date on which this ordinance shall take effect, the provisions thereof shall be controlling within the limits of the *[jurisdiction]*. The same are hereby adopted as the *[code, standard]* of the *[jurisdiction]* for the purpose of prescribing regulations governing conditions hazardous to life and property from fire or explosion and providing for issuance of permits and collection of fees.

SECTION 2 Any person who shall violate any provision of this code or standard hereby adopted or fail to comply therewith; or who shall violate or fail to comply with any order made thereunder; or who shall build in violation of any detailed statement of specifications or plans submitted and approved thereunder; or fail to operate in accordance with any certificate or permit issued thereunder; and from which no appeal has been taken; or who shall fail to comply with such an order as affirmed or modified by a court of competent jurisdiction,

within the time fixed herein, shall severally for each and every such violation and noncompliance, respectively, be guilty of a misdemeanor, punishable by a fine of not less than $ _____ nor more than $_____ or by imprisonment for not less than _____ days nor more than _____ days or by both such fine and imprisonment. The imposition of one penalty for any violation shall not excuse the violation or permit it to continue; and all such persons shall be required to correct or remedy such violations or defects within a reasonable time; and when not otherwise specified the application of the above penalty shall not be held to prevent the enforced removal of prohibited conditions. Each day that prohibited conditions are maintained shall constitute a separate offense.

SECTION 3 Additions, insertions, and changes — that the *[year]* edition of NFPA *[document number]*, *[complete document title]* is amended and changed in the following respects:

List Amendments

SECTION 4 That ordinance No. _____ of *[jurisdiction]* entitled *[fill in the title of the ordinance or ordinances in effect at the present time]* and all other ordinances or parts of ordinances in conflict herewith are hereby repealed.

SECTION 5 That if any section, subsection, sentence, clause, or phrase of this ordinance is, for any reason, held to be invalid or unconstitutional, such decision shall not affect the validity or constitutionality of the remaining portions of this ordinance. The *[governing body]* hereby declares that it would have passed this ordinance, and each section, subsection, clause, or phrase hereof, irrespective of the fact that any one or more sections, subsections, sentences, clauses, and phrases be declared unconstitutional.

SECTION 6 That the *[jurisdiction's keeper of records]* is hereby ordered and directed to cause this ordinance to be published.

[NOTE: An additional provision may be required to direct the number of times the ordinance is to be published and to specify that it is to be in a newspaper in general circulation. Posting may also be required.]

SECTION 7 That this ordinance and the rules, regulations, provisions, requirements, orders, and matters established and adopted hereby shall take effect and be in full force and effect *[time period]* from and after the date of its final passage and adoption.

Annex E Informational References

E.1 Referenced Publications. The documents or portions thereof listed in this annex are referenced within the informational sections of this code and are not part of the requirements of this document unless also listed in Chapter 2 for other reasons.

E.1.1 NFPA Publications. (Reserved)

E.1.2 Other Publications.

E.1.2.1 NAR Publications. National Association of Rocketry, P.O. Box 407, Marion, IA 52302.

Model Rocket Safety Code, August 2012.

E.1.2.2 U.S. Government Publications. U.S. Government Publishing Office, 732 North Capitol Street, NW, Washington, DC 20401-0001.

Title 14, Code of Federal Regulations, Chapter 1, Subchapter F, Part 101, Subparts A and C, "Federal Aviation Administration Regulations."

Title 49, Code of Federal Regulations, Parts 172–173, "Department of Transportation Regulations."

E.2 Informational References. The following documents or portions thereof are listed here as informational resources only. They are not a part of the requirements of this document.

E.2.1 NAR Publications. National Association of Rocketry, P.O. Box 407, Marion, IA 52302.

Comprehensive CAR/NAR/TRA Rocket Motor Certification List.

E.2.2 TRA Publications. Tripoli Rocketry Association, Inc., P.O. Box 87, Bellevue, NE 68005.

Comprehensive CAR/NAR/TRA Rocket Motor Certification List.

E.3 References for Extracts in Informational Sections. (Reserved)

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