



Outdoor Free Flight 2022-2023



RULES GOVERNING MODEL AVIATION COMPETITION IN THE UNITED STATES

Amendment Listing

Amendment Topic	Publication Date	Description
Original Issue	1/1/2015	Publication of Competition Regulations
BOM	1/1/2013	Paragraph 1
Addition of event E-36	1/1/2013	Page 16
Change of Event number	1/1/2014	Page 4, 3 (101C, 102C-103C, 104C-105C)
Eliminate BOM rule	1/1/2015	Paragraph 1
Change definitions of Official and Unofficial flight	1/1/2015	Add 9A and removed corresponding definition in power, rubber, electric and CO ₂
Establishment of a Glider Pen	1/1/2015	Addition of paragraph 14
Change definition of Hand Launch	1/1/2015	Modification of 4.1
Change of Moffett Flight Rules	1/1/2017	Section 4.1, 4.2 and 5.1
Reduce motor run in E36	1/1/2017	Motor Run/Flight Maximum chart

Change Identification	1/1/2017	Paragraph 3, page OFF-3
Event 142 Launching	1/1/2019	Event 142, Section 4.1
E-36 motor run change	1/1/2022	Event E-36, Paragraph 3.2
Update FF Electric Power Events	1/1/2022	FF Electric Power Events section 2.1
Event 142	1/1/2022	Flight Max Section 7

Table of Contents

FREE FLIGHT, GENERAL	1
1. <i>Applicability</i>	1
2. <i>General</i>	1
3. <i>Identification</i>	1
4. <i>Land Plane Models (ROG, HL)</i>	2
5. <i>Seaplane Models (ROW)</i>	2
6. <i>Area of Supporting Surface(s)</i>	2
7. <i>Total Weight</i>	2
8. <i>Snuffer Tube</i>	2
9. <i>Timing of Flights</i>	3
9A. <i>Flight Attempts</i>	4
10. <i>Class of Flight</i>	4
11. <i>Records</i>	4
12. <i>Contestant’s Right to a Flight</i>	5
13. <i>Number of Models</i>	5
14. <i>Establishment of a Glider Pen</i>	5
FREE FLIGHT POWER events 101, 102, 103, 104, 105, 108, 109, 110, 152, 155, 158	5
1. <i>Applicability</i>	6
2. <i>General</i>	6
3. <i>Classification</i>	6
4. <i>Engine Run</i>	7
5.....	8
6. <i>Official Flights</i>	8
7. <i>Unofficial Flight</i>	8

8. <i>Number of Flights</i>	8
9. <i>Scoring of Flights</i>	10
FREE FLIGHT PAYLOAD AND CARGO events 106, 107	10
1. <i>Applicability</i>	10
2. <i>General</i>	11
3. <i>Model Classification</i>	11
4. <i>Engine</i>	11
5. <i>Pilot</i>	11
6. <i>Dummy Pilot Visibility</i>	11
7. <i>Landing Gear</i>	12
8. <i>Weight</i>	12
9. <i>Launch Area</i>	12
10. <i>Launch</i>	12
11. <i>Payload Procedure and Scoring</i>	12
12. <i>Cargo Procedure and Scoring</i>	13
FREE FLIGHT OUTDOOR RUBBER events 120, 121, 122, 124, 125, 126, 127, 128, 129, 151, 153	14
1. <i>Applicability</i>	14
2. <i>General</i>	14
3. <i>Events</i>	14
4. <i>Categories</i>	14
5. <i>Number of Flights</i>	15
6. <i>Scoring of Flights</i>	16
MULVIHILL RUBBER MODEL event 120	17
BIG E (SUPPLEMENTAL) event 121	17
DAWN UNLIMITED MODEL (SUPPLEMENTAL) event 122	17
1.	17

2.	17
3.	17
4.	17
5.	17
6.	17
P-30 MODEL Event 124.	18
1.	18
2.	18
3.	18
4.	18
5.	19
6.	19
ORNITHOPTER event 125.	19
AUTOGIRO event 126.	19
HELICOPTER Event 127.	19
MOFFETT event 128.	20
1. <i>Total Projected Flight Surface Area.</i>	20
2. <i>Length.</i>	20
3. <i>Cross-Section.</i>	20
4. <i>Weight.</i>	20
5. <i>Rubber Motor Weight.</i>	20
6. <i>Takeoff Gear.</i>	20
7. <i>ROG.</i>	20
BOSTONIAN (PROVISIONAL) event 129.	20
1. <i>Model Specifications:</i>	20
2. <i>Flying and Scoring Procedures:</i>	22

RUBBER SPEED (SUPPLEMENTAL) event 130.	23
1.	23
2.	23
3.	23
4.	23
5.	23
6.	23
7.	23
FREE FLIGHT FAI EVENTS events 150, 151, 152, 153, 154, 155, 156, 157, 158, 159.	23
1. <i>Applicability.</i>	23
2. <i>Classes.</i>	23
FREE FLIGHT OUTDOOR HAND LAUNCHED GLIDER event 140.	24
1. <i>Applicability.</i>	24
2. <i>General.</i>	24
3.	24
4. <i>Number of Models.</i>	25
5. <i>Official Flight.</i>	25
6. <i>Flight Maximum.</i>	25
7. <i>Number of Flights.</i>	25
8. <i>Scoring of Flights.</i>	25
FREE FLIGHT OUTDOOR CATAPULT GLIDER event 142.	25
1. <i>Applicability.</i>	25
2. <i>General.</i>	25
3. <i>Characteristics.</i>	26
4. <i>Launching.</i>	26
5. <i>Number of Models.</i>	26

6. <i>Official Flight</i>	26
7. <i>Flight Maximum</i>	26
8. <i>Number of Flights</i>	27
9. <i>Scoring of Flights</i>	27
FREE FLIGHT ELECTRIC POWER events 159, 160, 161, 165, 166.....	27
1. <i>Applicability</i>	27
2. <i>General</i>	27
3. <i>Motor Run/Flight Maximum</i>	28
4. <i>Number of Flights</i>	28
5. <i>Scoring of Flights</i>	29
6.	29
FREE FLIGHT ROCKET POWER (SUPPLEMENTAL) event 162.....	29
1. <i>Applicability</i>	29
2. <i>General</i>	29
3. <i>Categories</i>	29
4. <i>Power Unit Types</i>	30
5. <i>Power Unit Size</i>	30
6. <i>Power Unit Modifications</i>	30
7. <i>Mounting</i>	30
8. <i>Fuel</i>	30
9. <i>Power Unit Violations</i>	31
10.	31
11. <i>Number of Flights</i>	31
12. <i>Scoring of Flights</i>	31
13. <i>Safety</i>	31
CO₂ POWER event 163, 164, 156.....	31

1. <i>Applicability</i>	31
2. <i>General</i>	31
3. <i>Events/Specifications</i>	32
4. <i>Engine Run</i>	33
5. <i>Flight Maximum</i>	33
6.	33
7. <i>Number of Flights</i>	33
8. <i>Scoring of Flights</i>	33

FREE FLIGHT, GENERAL

Note: For FAI events see the FAI Sporting Code. The FAI Sporting Code may be obtained from AMA Headquarters. (When FAI events are flown at AMA sanctioned contests the common practice is to only use the basic model specifications and related items such as timing procedures, from the FAI Sporting Code, Section 4-Aeromodeling, Volume F1 Free Flight. Contest management and procedures usually follow the basic rule structure found in the General sections and specific category sections of the AMA Competition Regulations book.)

1. Applicability.

In addition to the following General Free Flight Rules and the specific rules for each Free Flight event, Free Flight model aircraft construction, flying and competition are also governed by the rules of the following section: Sanctioned Competition, Records, and General. The Builder of the Model rule shall not apply to Outdoor Free Flight events. Although the following general and specific rules primarily govern competitive activity in AMA events, it is strongly recommended that, in the interests of safety and consistency, they be followed in all Free Flight activity.

2. General.

A Free Flight model airplane is flown without controlling or guideline(s) and without any control of functions by radio except that the de-thermalizer function may be radio operated from the ground by the contestant. All Radio Frequency Operated de-thermalizer (RDT) units shall be commercially available. Frequencies shall be used that pose no interference possibilities with current R/C Model operations and each unit shall be capable of being uniquely digitally encoded to ensure no interference with other Free Flight models.

Flight duration requirements for official/unofficial status are specified in the various sections for specific classes of events (for example see page 12 sections 6 and 7; page 14 sections 11 and 12; page 15 sections 5 and 6). In addition to those unique event requirements, operation of the RFODT function will result in that flight being an official flight regardless of the flight time except for Cargo. For events with other conditions determining the “official/unofficial” status of the flight, such as engine run and in-flight collisions, those conditions shall take precedence over the RFODT official flight requirements.

3. Identification.

All models will be identified with the owner’s name and address and AMA number. All outdoor free flight models shall be identified with the contestant's AMA number permanently affixed to the upper surface of the right hand lifting surface, excepting autogiros, helicopters, and ornithopters where the contestant's AMA number shall be displayed on the model's fuselage. Height of the numbers

shall be at least one inch (1 ") or 1/3 of the wing root chord, whichever is less. Both stroke and width shall be such to enable ready recognition.

4. Land Plane Models (ROG, HL).

Except for specific events requiring rise-off-ground (ROG), all models shall be hand launched (HL).

4.1.

A model is hand launched when it is released or thrown into flight directly from the hand(s) of the contestant, with at least one hand on the fuselage (Exception: Hand Launched Glider, event 140, may be launched by the wingtip), without other assistance. The model shall not be launched from a height greater than the contestant's normal reach above the ground.

4.2.

A rise-off-ground model must be released without any push whatsoever. It must be held at the moment of release in such a manner that at least one or more points are resting on the ground or runway.

5. Seaplane Models (ROW).

Models shall have hull, floats, or pontoons that permit takeoff and which shall be capable of maintaining the model afloat unassisted for at least 30 seconds in the takeoff position with only the hull, floats, or pontoons immersed in the water. A rise-off-water model must be released without any push whatsoever. Models need not alight on water at the end of flight. Vertical takeoff not permitted.

6. Area of Supporting Surface(s).

The projected area of a supporting or stabilizing surface is the area seen when looking directly down on the surface. Supporting surface area enclosed in a fuselage or a stick shall not be considered as wing area. Projected area of the horizontal stabilizing surface(s) in excess of 50 percent of the projected area of the supporting surfaces (wing area) shall be considered as supporting surface for minimum and/or maximum area purposes. Some of the FF classes do not have area requirements.

7. Total Weight.

Free Flight models shall be limited to a total flying weight of not more than seven (7) pounds, four (4) ounces.

8. Snuffer Tube.

Any model employing a fuse-type timing mechanism shall, at all times, utilize a snuffer tube or other similar device to prevent the model from dropping the burning fuse. The device used shall automatically extinguish the fuse as soon as possible after it has served its purpose. If the effectiveness of the snuffer tube is questionable, the Contest Director has the right to request a demonstration.

9. Timing of Flights.

Time starts the instant a model is released for flight, or released from the towline in the case of such gliders, and includes the engine or rubber motor run of powered models. Time ends when the model touches the ground or water, meets an obstruction which prevents further flight, passes from the sight of the timer, or when the flight exceeds the maximum duration time of the event.

9.1.

The timer must remain on the ground and within 200 feet of the launch point during the timing of the flight.

9.1.1.

A protest of a violation of this rule must be submitted immediately.

9.1.2.

A protest will be held valid only if it is reasonably certain that the flight score was favorably affected by the violation.

9.1.3.

The burden of proof is on the one who protests. In cases of doubt as to the effect of the violation on the flight score, the contestant is to be favored.

9.1.4.

If the protest is held valid, the flight may be repeated without prejudice. If the flight cannot be repeated within the official contest time, then the CD must declare the original flight time valid, or allow the contestant sufficient time to repeat the flight.

9.2.

Should the model pass from the timer's sight, the stopwatch shall be permitted to run for an additional 10 seconds. Should the model reappear, timing is to be continued. Should the model fail to reappear within the allotted 10 seconds, the watch shall be stopped and the 10 seconds deducted from the indicated time, and the result recorded as the flight time.

9.3.

Use of binoculars or other timing aids by the timekeeper(s) for an official flight is permissible but not required.

9A. Flight Attempts:

a.

When the motor run of any powered event exceeds the official category limit or a limit set by the contest director by 0.1 second.

b.

When the flight is less than 20 seconds except if set higher in a particular event. A contestant can declare that the flight is official before making another flight.

c.

When a mid-air collision occurs with another model. The contestant can declare within 10 seconds if to continue timing the flight; such a choice is irreversible.

d.

When part of the model detach.

10. Class of Flight.

For competition purposes, an official flight may be recorded in one (1) event or category only; the event must be declared when the contestant requests an official flight.

11. Records.

In order for flights to be eligible for national record purposes in classes or events having categories, the meet and/or record trials must be run by the rules of only one (1) category on the same day. Supplemental or Provisional events do not qualify for records.

11.1.

The first official flights of a contest series is assumed to be the start of a record attempt. The start of any other record attempts (at a contest or record trials) must be declared prior to the first flight of each series of flights of a record attempt.

11.2.

All flights submitted for outdoor records shall be made between the hours of sunrise and sunset of the same day.

12. Contestant's Right to a Flight.

No contestant shall be deprived of a flight or be charged with an attempt for failure to start an engine or launch his model within some arbitrarily set time limit. His only penalty shall be his return to the end of the line where he shall get his appropriate turn to again fly. The only exception to this rule shall be at the stated closing time of the contest, at which time it is permissible to refuse a flight attempt to a contestant.

13. Number of Models.

Unless specific event rules declare otherwise in every Free Flight event, the contestant shall be allowed two (2) models; their respective parts may be freely interchanged. In the case of combined classes, each model may be of a different class, but in no case may the contestant use more than two (2) models in an event.

14. Establishment of a Glider Pen.

1.

For events 140 and 142, establishment of a Glider Pen shall be at the sole discretion of the Contest Director and must be included in the contest announcement.

2.

The size and shape of the Glider Pen shall be at the discretion of the Contest Director, but is recommended to be approximately 75 feet on each side (and) shall be placed a minimum of 100 feet downwind of the parking area.

3.

Easily identified markers, such as traffic cones, shall define each corner of the pen.

4.

Official flights, and no others, may only be flown from the Glider Pen. Test flying upwind of the pen is discouraged.

FREE FLIGHT POWER EVENTS 101, 102, 103, 104, 105, 108, 109, 110, 152, 155, 158.

31. Applicability.

All pertinent AMA regulations (see sections titled Sanctioned Competition, Records, Selection of Champions, and General) and the General Free Flight rules shall be applicable, except as specified below.

32. General.

A Free Flight power model airplane is powered by an internal combustion rotating crankshaft engine.

33. Classification.

FF power models are divided into land plane and seaplane categories. The following events have been established according to piston displacement of engine(s) in each category:

101 Class 1/2A: .000-.0504 Cubic Inch

102 Class A: .0505-.2000 Cubic Inch

103 Class B: .201-.300 Cubic Inch

104 Class C: .301-.400 Cubic Inch

105 Class D: .401-.670 Cubic Inch

108 Class ½ A Classic .000—.0504 cubic inch

109 Class AB Classic .051—.30 cubic inch

110 Class CD Classic .301—.670 cubic inch

152 F1C: (see FAI Sporting Code)

155 F1J: (see FAI Sporting Code)

158 F1P: (see FAI Sporting Code)

Definition of C (Classic). The limitation permits no variable incidence wing or tail, flaps, extensible surface, auto rudder, geared engines, or folding propellers. The only surface movement allowed is for de-thermalizing purposes. No other restrictions apply.

3.1.

Sixty percent of the actual piston displacement of four-stroke cycle engines shall be taken for competition classification purposes.

3.2.

Any extensions to the engine exhaust opening must not exceed four (4) inches in length from the centerline of the engine cylinder.

3.3.

If desired, two (2) or more of the above listed classes may be combined, so long as the displacement limits given are observed. When classes are combined such combinations shall be shown in sanction applications and contest announcements using numerical designations of classes combined, using the format described in Interpretation of Event Listings in the Contest Calendar.

4. Engine Run.

Contests for classes 1/2A, A/B, C/D shall be categorized by the length of engine run and maximum flight time to be used.

4.1.

Length of the engine run, after the model is released for flight, shall not exceed the following in each category.

	Engine Run Times (seconds)		
Cat	Hand Launched	VTO/ROG	ROW
I	12	15	15
II	9	N/A	11
III	7	N/A	9

If conditions warrant, the Contest Director may establish before competition starts, an engine run of less than the maximum established for Category I, II, or III. Engine run time is not to be changed after any official flight attempt has been made.

4.2.

Maximum flight time limit for each category shall be as follows:

Cat	1 Flight	3 Flights
I	5 min	15 min
II	3 min	9 min
III	2 min	6 min

4.3.

The length of the engine run is to be considered the elapsed time from the instant of launch to the last audible power (combustion) stroke. Propeller run down shall not be considered as engine run time.

5.

Launching shall be as specified for land plane or seaplane models, FF General.

6. Official Flights.

Flights of 20 seconds or more are official flights providing the engine run does not exceed the prescribed limits of either the event category or that established by the CD. Flights of less than 20 seconds may be declared official by the contestant, providing the prescribed engine run was not exceeded. The contestant's decision must be made immediately and cannot be reversed later.

7. Unofficial Flight.

An unofficial flight occurs:

a.

When the engine run exceeds the official category limits or the limits set by the CD.

b.

When the total flight is less than 20 seconds if the contestant's option described in the official flight paragraph is not exercised.

c.

When the model collides with another model during an official flight, the contestant may declare the flight to be unofficial—decision must be made immediately and cannot be reversed later.

d.

When model parts are dropped or model is aided by the contestant during the official portion of the flight, either directly or by artificial means.

8. Number of Flights.

Each contestant shall be allowed a total of six (6) attempts to make three (3) official flights.

8.1.

In Categories I, II, and III, if the three (3) official flights total the maximum allowed for the category flown, the contestant may attempt additional fly-off flights to break a tie score or for record purposes. All fly-off flights of land plane models are to be hand-launched. All flyoff flights of seaplane models are to be ROW.

8.1.1.

Fly-off engine runs and flight maximums are as follows:

Land Plane Fly-off Flights			
Cat	First	Second	Third and succeeding
I	10 sec. 300 sec. Max	8 sec. 300 sec. Max	8 sec. 300 sec. Max
II	7 sec. 180 sec. Max	5 sec. 180 sec. Max	5 sec. 180 sec. Max
III	5 sec. 120 sec. Max	5 sec. 120 sec. Max	4 sec. 150 sec. Max

8.1.2.

All fly-off flights of seaplane models shall have a maximum engine run and flight maximums as follows:

Seaplane Fly-off Flights			
Cat	First	Second	Third and succeeding
I	15 sec. 300 sec. Max	15 sec. 300 sec. Max	15 sec. 300 sec. Max
II	11 sec. 180 sec. Max	11 sec. 180 sec. Max	11 sec. 180 sec. Max
III	9 sec. 120 sec. Max	9 sec. 120 sec. Max	9 sec. 150 sec. Max

8.1.3 Engine Run Timing

a.

A gas powered engine run may be timed by one or two timers at the discretion of the contest management. Also the quantity of timers may be increased from one to two for any or all fly off flights. For a single timer the measured engine run time shall be rounded down to the nearest 0.1 seconds and recorded. For example, a reading of 5.09 seconds shall be rounded down to 5.0 seconds. For two

timers the average of the two measured times shall be rounded down to the nearest 0.1 seconds. An overrun is then any recorded time which is 0.1 seconds in excess of the allowed run times in 8.1.1 and 8.1.2 above.

b.

Stop watches capable of recording to at least 0.01 seconds shall be used with a split function to measure engine run separate from overall flight time. In lieu of a watch with split capabilities two watches may be used by the same timer with one watch for the engine run and the second for flight duration.

8.2.

In all categories the fly-off flight engine run is not to exceed the engine run time allotted to the first three (3) official flights, if this has been reduced by the Contest Director.

8.3.

In any category, only one (1) attempt is permitted for each fly-off flight. All official and unofficial flights as described above are attempts. The CD may, at his discretion, add further definitions because of local conditions, such as a time limit to start engines, so long as adequate notice is given all contestants before competition begins.

9. Scoring of Flights.

Scoring time shall be the total elapsed time of three (3) official flights plus the total time of the qualified fly-off flights. Flight time shall be scored in seconds, with all fractions of a second to be dropped. All individual flights exceeding the maximum flight time in the category flown shall be recorded as a maximum flight. An unofficial flight is scored as a zero (0).

FREE FLIGHT PAYLOAD AND CARGO EVENTS 106, 107.

1. Applicability.

All pertinent AMA regulations (see sections titled Sanctioned Competition, Records, Selection of Champions, and General) and the General Free Flight rules shall be applicable, except as specified below.

2. General.

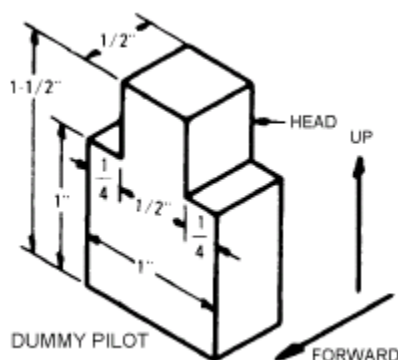
A Free Flight Payload or Cargo model is a model airplane powered by an internal combustion reciprocating engine which is flown without controlling or guide line. The model must carry in flight a payload or cargo as described below.

3. Model Classification.

Free Flight weight carrying models are divided into two (2) categories: 106 Payload—Projected wingspan shall not exceed 36 inches. 107 Cargo—Projected wingspan shall not exceed 48 inches.

4. Engine.

The engine(s) is limited to the conventional internal combustion reciprocating type of not more than .025 cubic inch total piston displacement. The propeller shall be attached and driven directly from the engine output shaft.



5. Pilot.

Payload and Cargo models must carry a dummy pilot having a minimum weight of one (1) ounce and minimum dimensions as shown in the accompanying sketch.

5.1.

In the case of the Cargo model, a simulated cargo must be included in a container and must be carried completely enclosed within the outside surfaces of the model. External cargo “packs” or “pods” will not be allowed. Any rigid material(s) can be used for the dummy pilot. Any material can be used for the simulated cargo; however, if liquid is used, it must be enclosed in a leak-proof container within the model as described above. Both dummy pilot and cargo are to be furnished by the contestant and shall be readily removable and replaceable for checking size and weight.

6. Dummy Pilot Visibility.

The dummy pilot must be in an upright position and facing forward with at least one half square inch of visibility through transparent areas to the front and both sides to provide forward and sideward visibility with the head of the pilot.

7. Landing Gear.

Landing gear may be removable but must remain attached to the model during the entire flight. It shall be of such a design and construction so as to support the model at rest in a normal symmetrical attitude and to support the model during completely unassisted takeoffs. The landing gear must have at least two (2) wheels, both of which rotate and function as wheels during takeoff.

8. Weight.

The total weight of the model ready to fly shall be a minimum of five (5) ounces, including dummy pilot. Ballast other than the dummy pilot or simulated cargo must be permanently affixed to the model. Total flying weight shall not exceed 100 ounces.

9. Launch Area.

The minimum takeoff area shall be 4 x 24 feet for Cargo.

10. Launch.

No mechanical device or added power shall be used to assist the model in rising from the ground. A completely unassisted (no pushing) launching is required for each official flight. The model must be held before release in such a manner that its natural resting position on the ground is in no way affected. However, in the event the CD decides the launching area is unsuitable for ROG launching, hand launched flights will be permitted.

11. Payload Procedure and Scoring.

13.1. Engine Run.

Length of engine run after model is released for flight shall not exceed 15 seconds ROG; for Category III, engine run shall not exceed 13 seconds ROG. If conditions warrant, the Contest Director may establish before competition starts an engine run of a different maximum limit.

11.2. Flight Maximum.

Three (3) minutes; Category III—two (2) minutes. See below for fly-off flights.

11.3. Number of Flights.

Each contestant shall be allowed a total of six (6) attempts to make three (3) official flights. All official and unofficial flights as described above are attempts. For Category I and II, if the three (3) official flights total nine (9) minutes, a fourth official flight shall be allowed having a maximum limit imposed of four (4) minutes (Category III—three (3) minutes). If a maximum flight is achieved, a fifth flight shall be allowed having a maximum limit imposed of five (5) minutes (Category III—four (4)

minutes), etc., until a winner is determined, or a maximum flight (which increases one (1) minute progressively) is not achieved. For Category III only, a reduced engine run of 10 seconds shall be used, with the model launched ROG, for all flyoff flights. All flyoff flights are official. The CD may, at his discretion, add further definitions because of local conditions, such as a time limit to start engines, so long as adequate notice is given all contestants before competition begins.

11.4. Scoring of Flights.

Scoring shall be the total elapsed time of three (3) official flights plus the total of qualified fly-off flights. Flight duration shall be scored in seconds with all fractions of a second to be dropped. Individual flights of more than three (3) minutes (Category III—two (2) minutes) shall be recorded as three (3) minutes (Category III—two minutes) except for qualified fly-off flights described above, which shall be recorded for their full prescribed flight duration limit.

12. Cargo Procedure and Scoring.

12.1. Engine Run.

Length of engine run after the model is released for flight shall not exceed 20 seconds ROG.

12.2. Number of Flights.

Each contestant shall be allowed a total of 12 attempts to make flights over 40 seconds.

12.3. Scoring of Flights.

The score of a contestant shall be the total gross weight of the three (3) best flights over 40 seconds completed within the allowed number of attempts. Gross weight is the all-up weight of the model as it is released for takeoff, and includes the model plus fuel, dummy pilot, and simulated cargo. In the event of a tie, the winner shall be the contestant whose model lifted the highest gross weight on any one official flight. Gross weight shall be recorded prior to each attempt, and all contestants must use the same weighing scale.

FREE FLIGHT OUTDOOR RUBBER EVENTS 120, 121, 122, 124, 125, 126, 127, 128, 129, 151, 153.

1. Applicability.

All pertinent AMA regulations (see sections titled Sanctioned Competition, Records, Selection of Champions, and General) and the General Free Flight Rules shall apply, except as specified below.

2. General.

A FF Outdoor Rubber Powered model airplane is powered by the energy of twisted or extended elastic strands.

3. Events.

The following events for outdoor rubber powered models have been established.

120 Mulvihill Model

121 Big E (Supplemental)

122 Dawn Unlimited (Supplemental)

124 P-30

125 Ornithopter

126 Autogiro

127 Helicopter

128 Moffett

129 Bostonian (Provisional)

130 Rubber Speed (Supplemental)

151 F1B Wakefield (See FAI Sporting Code)

153 F1G Coupe d'Hiver (See FAI Sporting Code)

4. Categories.

The following types of models may be flown in the established contest categories: Mulvihill Rubber, Autogiro, Ornithopter, Helicopter, and Moffett.

4.1.

Maximum official flight time limit in Autogiro, Ornithopter, and Helicopter for each category, except qualified fly-off flights, shall be as follows:

Autogiro, Ornithopter, and Helicopter			
Category	First Flight	Second Flight	Third Flight
I	5 minutes	5 minutes	5 minutes
II	3 minutes	3 minutes	3 minutes
III	2 minutes	2 minutes	2 minutes

4.2.

Maximum official flight time limit in Mulvihill Rubber and Moffett for each category, except for the fly-off flights, shall be as follows:

Mulvihill Rubber and Moffett			
Category	First Flight	Second Flight	Third Flight
I	5 minutes	6 minutes	7 minutes
II	3	4	5
III	2	3	4

5. Number of Flights.

Each contestant shall be allowed a total of six (6) attempts to make three (3) official flights except for P-30 where an unlimited number of attempts are allowed to make three (3) official flights.

5.1.

If the three (3) official flights total the maximum allowed for the category flown, then a series of fly-off flights may be taken. The maximum duration in Autogiro, Ornithopter, and Helicopter for the fourth flight and each successive fly-off flight thereafter shall be:

Autogiro, Ornithopter, and Helicopter			
Category	Fourth Flight	Fifth Flight	Additional Flights
I	6 minutes	7 minutes	Add 1 min.
II	4 minutes	5 minutes	Add 1 min.
III	3 minutes	4 minutes	Add 1 min.

The Maximum duration in Mulvihill Rubber and Moffett for the fourth flight and each successive fly-off flight thereafter shall be:

Mulvihill Rubber and Moffett			
Category	Fourth Flight	Fifth Flight	Additional Flights
I	8 minutes	9 minutes	Add 1 min.
II	6 minutes	7 minutes	Add 1 min.
III	5 minutes	6 minutes	Add 1 min.

Fly-off flights may continue until the contestant's model fails to reach the duration limit for that flight. Only one (1) attempt is permitted for each fly-off flight.

5.2.

All official and unofficial flights as described above are attempts. The Contest Director may, at his discretion, add further definitions because of local conditions, such as time limits between fly-off flights, provided adequate notice is given all contestants before competition begins.

5.3.

If weather or terrain make it desirable, the CD may reduce the maximum duration limit to suit the conditions. This reduction must be made before competition begins.

6. Scoring of Flights.

Scoring time shall be the total elapsed time of three (3) official flights, plus the total of all qualified flights described in the "number of flights" section. Flight duration shall be recorded in seconds with all fractions of a second dropped. Individual flights which exceed the duration limit of the category, including fly-

offs, shall be recorded in terms of the duration limit imposed for that flight. No unofficial flights are allowed.

MULVIHILL RUBBER MODEL EVENT 120.

A Mulvihill Rubber model has no design restrictions except that the projected area of the wing shall not exceed 300 square inches. Takeoff gear is not required. Launching shall be as specified for land plane or seaplane models, FF General.

BIG E (SUPPLEMENTAL) EVENT 121.

A Big E rubber model shall have a minimum projected wing area of 300 square inches. There are no other design restrictions. This event may not be combined with others in AMA sanctioned contests.

DAWN UNLIMITED MODEL (SUPPLEMENTAL) EVENT 122.

- 1.**
There are no restrictions to the design of the model except as detailed in 3 and below.
- 2.**
The rubber motor must be fully enclosed.
- 3.**
The model must be of cantilever form; no external bracing may be used.
- 4.**
The model is to be wound and launched during a 15-minute “time window,” to be determined by the Contest Director at the earliest time allowing visibility for retrieval.
- 5.**
The timekeeper will follow the model to make every effort to obtain a true launch-to-touchdown time.
- 6.**
One (1) flight only; highest time wins. No unofficial flights are allowed; however, a broken motor may be replaced if launch can still be made within the 15 minute window.

P-30 MODEL EVENT 124.

1.

Models shall conform to the following specifications:

1.1.

No part of the model shall exceed 30 inches when it is in assembled condition.

1.2.

The minimum weight of the model without rubber motor shall be 40 grams.

1.3.

The lubricated rubber motor shall not exceed 10 grams.

1.4.

The propeller shall be a commercially available plastic freewheeling propeller between 23 and 25 centimeters (9.05 and 9.84 inches) in diameter. Only the following changes will be allowed:

1.4.1.

Flashing may be removed.

1.4.2.

Balancing by the addition of weight to one blade will be allowed.

1.4.3.

Enlarging the hole of the propeller hub will be allowed in order to accept a larger diameter shaft and/or a bushing cut from metal tubing.

2.

Launching shall be as specified for land plane models, Free Flight General.

3.

A flight of more than 20 seconds shall be considered an official flight.

4.

There shall be no limit to the number of attempts allowed in order to record three (3) official flights.

5.

The maximum recorded duration for each flight shall be 120 seconds.

6.

If a tie exists after three (3) flights have been recorded then each successive flight shall have a maximum duration of 30 seconds more than the previous flight.

ORNITHOPTER EVENT 125.

An ornithopter model derives its propulsion solely from the flapping of its wing(s) or parts thereof. If part of a wing is fixed, the projected area of the flapping part shall be not less than that of the fixed part, and the fixed part(s) must not extend ahead of the leading edge or behind the trailing edge of the flapping parts. If the model has more than one wing, these restrictions apply independently to each wing, and the wings shall be substantially identical in size, shape, relative areas of fixed and flapping parts, and degree of flapping motion. The projected area of a flapping part is to be determined at a position midway between its extreme positions. No part of the horizontal stabilizing surface(s) shall be within a horizontal distance of one-fourth the wingspan from any part of a wing, and the total projected area of such surfaces shall not exceed 50 percent of the total wing area. No protuberances or extensions of the fixed or flapped parts, which would satisfy the letter of these rules while violating their spirit or intent, are permitted. Takeoff gear is not required. Launching may be by any of the methods specified for land plane models.

AUTOGIRO EVENT 126.

An autogiro model is supported in flight by the action of vanes which rotate freely on an approximately vertical axis, supplemented by the thrust of propeller(s) on an approximately horizontal axis. If fixed wing(s) is/are employed, the projected area of the vanes shall be not less than that of the fixed wing(s), and the sums of these projected areas shall be considered the main supporting surface(s). Takeoff gear is not required. Launching may be by any of the methods specified for land plane models.

HELICOPTER EVENT 127.

A helicopter model rises without assistance and is supported in flight solely by the lift of power-driven propeller(s) and/or vane(s). The projected area of the propeller(s) and vane(s) shall be considered as supporting surface(s). Takeoff gear is not required.

Launching may be by any of the methods specified for land plane models.

MOFFETT EVENT 128.

1. Total Projected Flight Surface Area.

Wing and stabilizer shall not exceed 202 square inches (13 square decimeters).

2. Length.

Distance between propeller thrust bearing and far edge of stabilizer, fin or fuselage shall not exceed the projected wing span.

3. Cross-Section.

The fuselage cross-section at the point of maximum area shall be at least “Length” squared divided by 150.

4. Weight.

Airframe weight shall be at least 1.75 ounces (50 grams) per 100 square inches of projected wing area.

5. Rubber Motor Weight.

No limit.

6. Takeoff Gear.

Takeoff gear shall support the model unassisted on three (3) points on the takeoff area and support the model during all unassisted takeoffs.

7. ROG.

All Championship or record flights are rise-off-ground* with no push. Model must be held before release in such a manner that all three (3) of its supporting points as defined in paragraph 6 are in contact with the takeoff surface. Model must take off unassisted while in this position. *ROG from a table (not over 30 inches high) is acceptable.

BOSTONIAN (PROVISIONAL) EVENT 129.

1. Model Specifications:

1.1.

Projected wingspan shall not exceed 16 inches.

1.2.

Wing chord (measured parallel to the direction of flight and including any trim tabs) shall not exceed 3 inches.

1.3.

The diameter of the propeller shall not exceed 6 inches.

1.4

The overall length of the model, excluding the propeller but including the prop-shaft bearing, shall not exceed 14 inches. This measurement is made in the direction of flight and includes surfaces that extend beyond the prop-shaft bearing or fuselage end.

1.5.

The fuselage surface must enclose an imaginary box that has minimum dimensions of 1.5 inches in width, 2.5 inches in height, and 3.0 inches in length parallel to the line of flight. The width (horizontal dimension perpendicular to the line of flight) of the fuselage shall not exceed 2.0 inches. The fuselage must be covered so as to restrict free air movement through the box. Normal sag of the framework between supports caused by the tension of the covering will not be considered as a violation of this rule. The fuselage must contain the rubber motor(s) and its structure must be built-up so that the longitudinal members (longerons) support the forces produced by the rubber motor. A solid or hollow motor stick with a structure added to satisfy the box requirement is not acceptable.

1.6.

The fuselage must have a transparent windshield and side windows of at least 1 square inch projected area each as viewed from the front or side, respectively. Thus, a wrap-around windshield can count as both a windshield and side windows. An open cockpit design needs not have side windows, but the windshield must meet the one-square inch rule and must stand at least 3/4 inch above the top of the part of the fuselage ahead of the cockpit.

1.7.

A landing gear, capable of supporting the model when it is at rest and during takeoff and landing, must be provided. The model must have at least two wheels of at least 3/4-inch diameter which rotate freely. The inside surfaces of the wheels must be separated by at least 2.5 inches in the direction of the axis of the wheels.

1.8.

All flying surfaces must be covered on both sides or must be solid material with a thickness of at least 1/16 inch at the maximum point in each chord

wise element. The term "flying surfaces" includes all surfaces such as those typically intended to provide lift, stability or tip-vortex suppression including, but not limited to, wings, canard surfaces, tail surfaces, winglets and tip plates.

1.9.

To qualify as a monoplane, the total projected area of the secondary horizontal surface(s) (conventional stabilizer or canard surface, including trim tabs) excluding that inside the fuselage, shall not exceed 24 square inches. Secondary horizontal surfaces exceeding this are considered to be additional wings.

1.10.

The model, excluding the rubber motor, shall weigh at least 14 grams for a monoplane or 20 grams for others.

1.11.

No trim tabs or other appendages that result in specified dimensions being exceeded are allowed.

2. Flying and Scoring Procedures:

All provisions of Free Flight, General and Free Flight Outdoor Rubber apply with the following exceptions:

2.1.

A flight of more than 10 seconds, rather than 40, is an official flight.

2.2.

The maximum duration for all categories for all flights, including fly-offs flights, is two minutes.

2.3.

The model must ROG on all official flights unless the Contest Director allows hand launching because of flying site conditions. The provisions of paragraph 4, Land Plane Models (ROG, HL) of Free Flight, General are applicable with the addition that if the model bounces during the takeoff the timing shall continue unless the model fails to achieve continuous flight.

RUBBER SPEED (SUPPLEMENTAL) EVENT 130.

1.

This event is for propeller driven rubber-powered models.

2.

No model dimension may exceed 36 inches.

3.

Models must ROG from a takeoff table. The table may be set at any angle to suit the contestant. Catapulting or pushing of models is not allowed. Neither wheels or takeoff gears are required. Dollies, drop off gears or skids may be used.

4.

The length of the speed course shall be 200 feet, starting at the end of the takeoff table.

5.

The model may not roll about its longitudinal axis more than 360 degrees during its travel over the course.

6.

There will be no limit to the number of flight attempts permitted.

7.

The model shall be timed from the time it leaves the takeoff table until it passes over the finish line. Flights shall be timed to the nearest 1/100 of a second. The speed in miles per hour is determined by the equation:

$$\text{Speed (mph)} = 136.3636/\text{Time (Sec)}$$

The fastest speed will determine the winner.

FREE FLIGHT FAI EVENTS EVENTS 150, 151, 152, 153, 154, 155, 156, 157, 158, 159.

1. Applicability.

For national competition and record purposes, all pertinent AMA regulations (see sections titled Sanctioned Competition, (Records, Selection of Champions, and General) and the FAI Sporting Code Section 4-Aeromodeling Volume F1 Free Flight shall apply, except as specified below.

2. Classes.

The following classes have been established:

- 150 F1A (Nordic A-2 Glider)
- 151 F1B (Wakefield Rubber-Powered)
- 152 F1C (Gas-Powered)
- 153 F1G (Coupe d’Hiver)
- 154 F1H (A1 Glider)
- 155 F1J (1/2A Power)
- 156 F1K (CO2)
- 157 F1E Slope Soaring Glider
- 158 F1P Power
- 159 F1Q Electric Power
- 166 F1S

(Note: For FAI events see the FAI Sporting Code.) The FAI Sporting Code may be obtained from AMA Headquarters. (When FAI events are flown at AMA sanctioned contests the common practice is to only use the basic model specifications and related items such as timing procedures, from the FAI rules. Contest management and procedures usually follow the basic rule structure found in the General sections and specific category sections of the AMA Competition Regulations book.)

FREE FLIGHT OUTDOOR HAND LAUNCHED GLIDER EVENT 140.

1. Applicability.

All pertinent AMA regulations (see sections titled Sanctioned Competition, Records, Selection of Champions, and General) and the General Free Flight rules shall apply, except as specified below.

2. General.

An Outdoor Hand Launched Glider is a non-powered model aircraft designed to fly outdoors with a projected wingspan less than or equal to one (1) meter (39.37 inches).

3.

Launching shall be as specified for hand launch of land plane models, FF General.

4. Number of Models.

Each contestant shall be allowed a maximum of three (3) models in this event. He may use any or all to complete his fights. The three (3) models used may be of different design.

5. Official Flight.

All flights are official flights, regardless of duration. Unofficial flights are not recognized. Flights during which any part is dropped shall be declared an official flight with zero (0) time.

6. Flight Maximum.

Two (2) minutes.

7. Number of Flights.

Each contestant shall be allowed a total of six (6) official flights except in cases where the total of the highest three (3) of not more than six official flights equals six (6) minutes.

When a three flight total of six (6) minutes has been scored (whether or not all six (6) flights have been made) a series of fly-off flights having a maximum flight duration limit of two (2) minutes shall be permitted. Fly-offs shall continue until the contestant fails to achieve the two (2) minute maximum duration limit.

8. Scoring of Flights.

Scoring time shall be the total elapsed time of the best three (3) of not more than six (6) official flights plus that of qualified additional flights. Flight duration shall be scored in seconds with all fractions of a second to be dropped. Individual flights of more than two (2) minutes shall be recorded as two (2) minutes.

FREE FLIGHT OUTDOOR CATAPULT GLIDER EVENT 142.

1. Applicability.

All pertinent AMA regulations (see sections titled Sanctioned Competition, Records, Selection of Champions, and General) and the General Free Flight rules shall be applicable, except as specified below. “Builder of the model rule shall not apply to event 142”

2. General.

An Outdoor Catapult Glider is powered by the energy of stretched elastic bands as further defined below.

3. Characteristics.

3.1.

The glider shall have a rigid wing. Auto surfaces, folders, sliders, Rogallo wings and the like are prohibited.

3.2.

The glider shall have a maximum weight of 1.5 ounces.

4. Launching.

Launching shall be by means of a hand-held catapult, as described below. During launching, the contestant must hold the catapult in one hand and release the model from the other hand.

4.1.

A hand-held catapult is composed of a solid handle not exceeding six (6) inches in length and a two-strand loop of $\frac{1}{4}$ inch (or equivalent, i.e. four strands of $\frac{1}{8}$ ") rubber (FAI, Pirelli, etc.) that has a finished length up to but not exceeding nine (9) inches. One end of the rubber loop(s) shall be attached to one end of the handle. Loop(s) may be pulled in a single straight line only. Hollow tubular handles or other turnaround setups allowing multiple line(s) of stretch between the top and bottom of the handle shall not be permitted.

4.2.

The hand-held catapult is to be provided by the contestant but is subject to approval by the Contest Director. More than one (1) hand-held catapult may be used in any given contest.

5. Number of Models.

Each contestant shall be allowed a maximum of three (3) models in this event. He may use any or all to complete his flights. The three models may be of different design.

6. Official Flight.

All flights are official flights, regardless of duration. Unofficial flights are not recognized. Flights during which any part is dropped shall be declared an official flight with zero (0) time.

7. Flight Maximum.

Ninety (90) seconds.

8. Number of Flights.

Each contestant shall be allowed a total of six (6) official flights except in cases where the total of the highest three (3) of not more than six (6) official flights equals 270 seconds. When a three (3) flight total of 270 seconds has been scored (whether or not all six (6) flights have been made) a series of fly-off flights having maximum flight duration of two (2) minutes shall be permitted. Fly-offs shall continue until the contestant fails to achieve the two (2) minute maximum duration limit.

9. Scoring of Flights.

Scoring time shall be the total elapsed time of the best three (3) of not more than six (6) official flights plus that of qualified additional flights. Flight duration shall be scored in seconds with all fractions of a second to be dropped. Individual flights of more than two (2) minutes shall be recorded as two (2) minutes.

FREE FLIGHT ELECTRIC POWER EVENTS 159, 160, 161, 165, 166.

1. Applicability.

All pertinent AMA regulations (see sections titled Sanctioned Competition, Records, Section of Champions, and General) and the General Free Flight rules shall be applicable, except as specified below.

2. General.

A Free Flight Electric Power model electric airplane is powered by a motor that receives as its sole source of power, energy from electrical current derived from rechargeable batteries self-contained in the model.

2.1. The following events have been established:

Event 159 F1Q Electric Power (See FAI Sporting Code)

Event 160 Class A Electric Power.

Event 161 Class B Electric Power.

Event 165 E-36 Electric Power.

Event 166 F1S Electric Power. (See FAI Sporting Code)

2.2. E-36 Model Requirements

1.
36 inch projected wingspan maximum.

2.
120 gram minimum weight, ready-to-fly.
3.
No auto surfaces permitted. After launch, only one movement permitted of horizontal stabilizer or wing, for dethermalization only.

2.3. E-36 Power Requirements

1.
Any type electric motor allowed.
2.
Battery limitations: 2-cell lithium limit or 6-cell NiMH or Alkaline limit.
3.
Gearing and folding props allowed.

3. Motor Run/Flight Maximum.

The maximum recorded duration of each flight shall be two (2) minutes, including qualified fly-off flights.

3.1.

All models shall be hand launched. Launching shall be as specified for hand launch of land plane models, FF General.

3.2.

The length of motor run is to be considered the elapsed time from the instant of launch to the time when electric power is cut off to the motor. Propeller braking, or unpowered prop run-down, shall not be considered as motor run time. Motor runs may be timed only in flight.

Motor Run	A Electric	B Electric	E-36
Flights 1,2,&3	10 seconds	10 seconds	10 seconds
Flight 4 and all following	5 seconds	5 seconds	5 seconds

4. Number of Flights.

Each contestant shall be allowed a total of six (6) attempts to make three (3) official flights. All official and unofficial flights described above are attempts.

4.1.

If the three (3) official flights total the maximum allowed, then a series of fly-off flights may be taken. Fly-off flights may continue until the contestant's model fails to reach the flight maximum. Only one (1) attempt is permitted for each fly-off flight. Fly-off motor run times are as shown in the table above. Overruns after the third official flight to be automatically awarded a "0" score.

4.2.

The CD may at his discretion, add further definitions and/or reduce the maximum duration limits due to weather, terrain, or local conditions, so long as adequate notice is given to all contestants before competition begins. However, flight(s) and flight time(s) flown under CD-imposed rule deviations shall not to be considered for record purposes.

5. Scoring of Flights.

Scoring shall be the total elapsed time of the three (3) official flights plus the total of the qualified fly-off flights. Flight duration shall be scored in seconds with all fractions of seconds dropped. Individual flights that exceed the maximum flight limit shall receive the maximum flight limit as a score. An unofficial flight is scored as a zero (0).

6.

Six attempts for the first three official flights are allowed, immediate declaration required and 20 second maximum for attempts, overruns being automatic attempts for the first three official flights.

FREE FLIGHT ROCKET POWER (SUPPLEMENTAL) EVENT 162.

1. Applicability.

All pertinent AMA regulations (see sections titled Sanctioned Competition, Records, Selection of Champions, and General) and the General Free Flight rules shall be applicable, except as specified below.

2. General.

An Outdoor Rocket Powered Free Flight model is propelled by a reaction engine of the Jetex type.

3. Categories.

The following categories have been established. Maximum flight for each is as follows:

Rocket Power		
Category	First Flight	Third Flight
I	4 minutes	12 minutes
II	3 min	9 min
III	2 min	6 min

3.1.

A qualified fourth flight may be flown by the contestant who maxes out in the category flown. No maximum time limit is imposed on the fourth flight.

4. Power Unit Types.

Rocket-powered Free Flight models are fitted with one (1) rocket engine of the Jetex type. An engine manufactured by other than “Jetex” is permissible provided the engine uses the same type and amount of fuel and has equal safety features.

5. Power Unit Size.

Any single Jetex type engine, up to and including the 150, may be used provided the cylinder length and diameter (inside) are not larger than the original Jetex engine. For example: The 50B size may not exceed the inside dimensions of the Jetex 50B.

6. Power Unit Modifications.

The Jetex engines cannot be modified or altered in any way to produce more power or endurance than is provided for in the manufacturer’s standard operating instructions. All gaskets must be in place. Engines other than Jetex must have comparable cylinder capacity. An augments tube may be used. Maximum length of fuse permitted is six (6) inches.

7. Mounting.

For safety, all units shall be firmly mounted and equipped with a metal tether to effectively prevent the power unit from separating from the model. Violation of this regulation shall be cause for disqualification from the event.

8. Fuel.

Only solid fuel produced commercially for model rocket engines may be used. Partial charges may be loaded (within standard cylinder capacity) to increase duration. In addition, charges may be scored or dimpled to facilitate ignition, but may not be otherwise modified.

9. Power Unit Violations.

The CD may call for a spot check immediately before or after an official flight to determine if the engine size and fuel charge are legal. If they are not in accordance with the rules, that flight will be voided and lost. Any engine considered dangerous by the CD may be impounded by him until the close of the contest.

10.

Launching shall be as specified for land plane models, FF General.

11. Number of Flights.

Each contestant shall be allowed a total of six (6) attempts to make three (3) official flights. If the contestant's three (3) official flights total the maximum in the category flown, he shall be allowed one (1) attempt to make a fourth official flight of unlimited duration. All official and unofficial flights, as described above, are attempts. The Contest Director may, at his discretion, add further definitions, such as time limit to launch model, launch area, and others, so long as adequate notice is given to all contestants before the competition begins.

12. Scoring of Flights.

Scoring time shall be the total elapsed time of the three (3) official flights plus a qualified fourth flight. If a contestant's flight time exceeds the official limits of the category flown, his time is to be recorded as the maximum time allowed.

The qualified fourth flight is of unlimited duration. Flight duration shall be recorded in seconds, with all fractions of a second dropped. An unofficial flight is scored as zero (0).

13. Safety.

Contestants are encouraged to wear safety goggles, safety glasses, or some other eye protective device during the lighting of the fuse and the launching of the model.

CO₂ POWER EVENT 163, 164, 156.

1. Applicability.

All pertinent AMA regulations (see sections entitled Sanctioned Competition, Records, Selection of Champions, and General) and the General Free Flight rules shall be applicable, except as specified below.

2. General.

A Free Flight CO₂ power model airplane is powered by a rotating crankshaft engine(s) that operates from the expansion of carbon dioxide (CO₂) vapor supplied from a tank(s) onboard the model. Engine(s) and tank(s) are to be, or have been, commercially available.

3. Events/Specifications.

The following Outdoor Free Flight events for CO₂ Power models have been established:

163 CO₂ Unlimited

164 USA F1K CO₂

156 FAI F1K CO₂ (see FAI Sporting Code)

3.1

163 CO₂ Unlimited model(s) shall have no restrictions, other than no metal propeller blades and the maximum fuel allotment allowed per paragraph 3.3 below.

3.2

164 USA F1K CO₂ models shall have a maximum projected surface area total (St) of 186 square inches (12dm²). Surface area total (St) includes the total surface area of wing(s) and that of the horizontal or oblique stabilizer(s). Maximum fuel allotment allowed per paragraph 3.3 below.

3.3

The maximum amount of fuel (CO₂) carried onboard the model shall be determined by the ratio between the tank volume and the piston displacement, or specified tank size as follows:

163 CO₂ Unlimited 40:1

164 USA F1K CO₂ 3cc tank

All tubing between the engine(s), tank(s), and filler nozzle shall not exceed 2 mm OD (outside diameter).

3.4

To aid in determining the maximum tank volume allowed, the following formulas shall be used as required. Volume computations are to be rounded up or down to the nearest full cubic centimeter (cc).

(Example: $.07372\text{cc} \times 40 = 2.94988\text{cc} = 3\text{cc}$ tank)

a. $\text{cc} = \text{cid} / .061023$ (cc=cubic centimeters)

b. $\text{cid} = \text{cc} \times .061023$ (cid=cubic inches displacement)

4. Engine Run.

Length of the engine run, after the model is released for flight, shall not be timed.

5. Flight Maximum.

The maximum recorded duration for each event shall be two (2) minutes, including qualified fly-off flights.

6.

Launching shall be as specified for hand launch of land plane models, FF General.

7. Number of Flights.

Each contestant shall be allowed a total of six (6) attempts to make three (3) official flights. All official and unofficial flights above are described are attempts.

7.1.

If the three (3) official flights total the maximum allowed, then a series of fly-off flights may be taken. The engine must run for a minimum of thirty (30) seconds prior to launching on the first (1st) fly-off flight, and increased by thirty (30) seconds on each subsequent flight. Fly-off flights may continue until the contestant's model fails to reach the flight maximum. Only one (1) attempt is permitted for each fly-off flight. An attempt is less than 20 seconds. The official timer shall be responsible for timing the pre-launch engine run and fly-off time which begins upon launching. No engine adjustments, direct or indirect, are allowed during the pre-launch engine run(s), except in the event that the engine starts and runs in reverse. In such cases, the contestant may stop the engine, have the timing official reset his timer, and begin anew. No additional fuel (CO₂) is allowed.

7.2.

The CD may, at his discretion, add further definitions because of local conditions, such as a time limit to start engines, so long as adequate notice is given all contestants before competition begins.

7.3.

If weather or terrain makes it desirable, the CD may reduce the maximum duration limit to suit the conditions. This reduction must be made before competition begins.

8. Scoring of Flights.

Scoring time shall be the total elapsed time of the three (3) official flights plus the total elapsed time off all qualified fly-off flights and, if applicable, shall include the total elapsed time of the final fly-off flight where the contestant's model failed to max. Flight time shall be scored in seconds, with all fractions of a second to be

dropped. All individual flights exceeding the specified maximum flight time shall be recorded as a maximum flight. An unofficial flight is scored as a zero (0). Flights of 20 seconds or more are official flights providing the engine run does not exceed the prescribed limits of either the event category or that established by the CD. Flights of less than 20 seconds may be declared official by the contestant, providing the prescribed engine run was not exceeded. The contestant's decision must be made immediately and cannot be reversed later.