



# **Competition Regulations**

## **2011-2012**

### **Rules Governing Model Aviation Competition in the United States**

## **Indoor Free Flight**

#### **Amendment Listing**

Original Issue	1/1/2011	Publication of Competition Regulations
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# Indoor Free Flight

## FREE FLIGHT INDOOR RUBBER

For events 201, 202, 204, 205, 206, 207, 208, 209, 210, 211, 213, 214, 215, 216, 220.

**1. Applicability.** All pertinent AMA regulations (see sections titled Sanctioned Competition, Records, Selection of Champions, and General) shall be applicable, except as specified below.

**2. General.** A powered model of the indoor type shall be so designed that it can only be properly flown indoors. Filling or inflating any part of an indoor rubber model with lighter-than-air gases (example: hydrogen, helium) is strictly prohibited. The flier or proxy flier of an Indoor model must either hold the model or wind the motor; auxiliary winding devices which facilitate one-man winding are permitted if operated by the flier.

**3. 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 stick shall not be considered as wing area. Projected area of horizontal stabilizing surface(s) in excess of 50 percent of the projected area of the supporting surface (wing area) shall be considered as wing area.

**4. Classes.** Indoor model classes which shall be recognized for competition and national records are defined as follows.

**Rise-Off-Ground Stick Model**—the projected area of the supporting surface(s) shall not exceed 30 square inches; see also section 13.

**Intermediate Hand-Launched Stick Model**—the projected area of the supporting surface(s) shall not exceed 100 square inches; see also section 13, 15.

**Hand-Launched Stick Model**—no restrictions on model size; see also section 13.

**Rise-Off-Ground Cabin Model**—the projected area shall not exceed 150 square inches; see also section 14.

**FAI Indoor Model (F1D)**—specifications, flying rules, and scoring rules are the same as for world championship Indoor models. (See *FAI Sporting Code*.)

**FAI Indoor Model (F1M)**—

Specifications, flying rules, and scoring rules are the same as for world championship Indoor models. (See *FAI Sporting Code*.)

**Autogiro**—no restrictions on model size; see also section 16.

**Ornithopter**—no restrictions on model size; see also section 17.

**Helicopter**—no restrictions on model size; see also section 18.

**Easy B**—see section 19.

**Manhattan Cabin**—see section 20.

**Pennyplane and Limited**

**Pennyplane**—see section 21.

**Bostonian**—see section 22.

**FAI Indoor Model (F1L EZB)**—specifications, flying rules, and scoring rules are the same as for FAI Indoor Models. (See *FAI Sporting Code*.)

**Kit/Plan Scale**—see section 23.

**Mini-Stick**—see section 24 and section 13.

**Experimental Autogiro**—see section 25.

**5. Launching.** Launching shall be appropriate to class of model. When hand launching is called for, the model shall be released into flight directly from the hands of the contestant, without other assistance. The model shall not be launched from a height greater than the flier's normal reach above the floor. When rise-off-ground launching is called for, the following requirements shall be met by Indoor models.

**5.1.** A rise-off-ground (ROG) Indoor model shall have a takeoff gear that permits it to take from the ground or floor under its own power. Takeoff gear must be strong enough to support model in a normal attitude while at rest and permit to take off without damage, nosing over, or striking wing tip. When one wheel is used, skids or similar devices shall be required to keep the model upright and in a normal attitude and to prevent any part other than the takeoff gear from touching the ground, floor, or runway. At the moment of release, the model must be held in such a manner that at least one (1) or more points are resting on the ground, floor, or runway.

**5.2.** The minimum diameter of wheel(s) for rise-off-ground models shall be: stick, 0.50 inches (1.27 centimeters); cabin, 0.75 inches (1.905 centimeters). The wheel(s) shall rotate freely.

**6. Number of Models.** There is no limit to the number of models that a contestant may use in Indoor Rubber classes to complete his flights, except noted in individual event rules.

**7. Official Flight.** Only flights 60 seconds or longer shall be considered official unless specified otherwise in individual event rules. A flight may be terminated by any physical means before the flight becomes official. A flight of less than 60 seconds duration will be considered a delayed flight; one delayed flight shall be allowed for each of the five official flights. After a delayed flight, the next launch shall result in an official flight being recorded, regardless of the actual flight time.

**8. Collision Rule.** In the event of a collision between two (2) models in flight, each competitor must choose, within two (2) minutes after termination the flight, to either accept the flight time as official to make another flight. The reflight must be made before the next official flight. If the choice is to make another flight, no time is recorded for the rejected flight.

**9. Timing of Flights.** Method of timing shall appropriate to the class of model and required method of launching.

**Hand-Launched Classes** (except FAI Indoor and FAI EZB). Time of flight starts the instant model is launched by hand, and ends when the model comes to rest on the floor of the building, or when model jettisons any parts. "Comes to rest" is interpreted to mean "belly down."

**Rise-Off-Ground Classes.** Time of flight starts the instant the model is released, and includes the takeoff roll. If the model bounces during takeoff, timing will continue provided the model becomes successfully airborne within the delayed flight period (60 seconds, unless specified otherwise in individual event rules). If the model does not become successfully airborne within the delayed flight period, then the flight will be declared a delayed flight. Time of flight ends when any part of the model touches the floor after the end of the delayed flight period, or when the model jettisons any parts. In a normal landing, this is when the wheel(s) or landing gear first touches the floor. The landing roll is not included in the flight time.

**All Classes.** If an obstruction is met which stops the flight, the stopwatch shall be permitted to run for 10 seconds. If, within that time, the model frees itself, timing is to continue. If the model

does not free itself within the 10 seconds allotted, the watch shall be stopped, 10 seconds deducted from the time indicated, and the result recorded. Situations involving collisions with another model or a balloon string or steering rod are defined in sections 7 and 8 and the steering rules as reprinted from the *FAI Sporting Code*, immediately following section 25. If an Indoor helicopter ceases translational movement and if any rotor(s) or vane(s) stop rotating, the flight shall be considered to have stopped. In that case, the watches shall be permitted to run for an additional 10 seconds. If translational movement resumes or if the stopped rotor(s) or vane(s) resume rotation within 10 seconds, timing shall continue. Otherwise, the watches shall be stopped and 10 seconds shall be deducted from the time indicated and the resulting time recorded.

**10. Scoring of Flights.** Scoring time shall be the longest of not more than five (5) official flights. Flight duration shall be reduced to the nearest whole second. Example: Identical (tie) scores shall be resolved by considering the next lowest scores of each contestant involved. In case the tie is still not resolved, continue the process to include lower ranking scores until the tie is resolved.

**11. Steering of Model.** Steering is intended to alter the direction of flight and the general location of a model which is approaching the structure of the building. The intent of the rule is to avoid influencing either the altitude of the model or its rate of climb or descent during the period of steering. Steering rules for AMA events shall be identical to the current rules for FAI Indoor Models (F1D). The steering section of the FAI Indoor rules is reprinted immediately after section 25.

**12. Flying for Record.** National record performances shall be recognized for flights made in each of the following types of buildings: Category I Buildings having ceilings less than eight meters (26' 3").

Category II Buildings having ceilings between eight and 15 meters (26' 3" to 49' 2.5").

Category III Buildings having ceilings between 15 and 30 meters (49' 2.5" to 98' 5").

Category IV Buildings having ceiling over 30 meters (higher than 98' 5").

**12.1.** The height of the building is defined as the vertical distance from the floor to the highest point at which a circle of 15 meters

(in diameter) can be inscribed, below the primary structure of the building.

**12.2.** In FAI Indoor (FID), a record flight shall be the best single flight of a series of six (6) flights.

**12.3.** If an indoor site contains a reasonably permanent structure with an elevated upper surface larger than 15 meters in its smallest dimension, flights may be launched from this surface provided:

**a.** The added elevation of the launch surface does not change the official ceiling category of the flight.

**b.** The model must land no lower than the elevation of the launch point. If the model lands below the launch point, the flight shall be recorded as zero time or score.

**13. Stick Model.** *For event 201.* A model of the stick type has a body composed of stick(s), tube(s) or open framework, rather than a fuselage. Models using tubes or framework to enclose rubber motor(s) shall have a total maximum cross-sectional area of the tube(s) or stick(s) not greater than  $L^2/150$ , where "L" equals the overall length of the model, excluding the propeller(s).

**14. Cabin Model.** *For event 204.* A Cabin model has a built-up, enclosed fuselage. The total maximum cross-section of the fuselage(s) must not be less than  $L^2/100$  where "L" equals the overall length of the model, excluding the propeller(s). In cases of doubt, the contestant shall present a full-size drawing of the maximum cross-section. The drawing shall be ruled into half inch squares. The fuselage(s) shall have not less than 90 percent of its/their surface area covered. Outriggers and booms may be used. The rubber used for motive power shall be contained entirely within the built-up fuselage(s). The maximum cross-section must be taken at some point on the fuselage which contains the rubber motor(s). A rolled tube used as part of an indoor cabin model fuselage shall not be considered to be a built-up structure. When a rolled tube is used as part of a cabin model fuselage, the balsa shall not be considered to be covering. When covered superstructure is used to fulfill the cross section requirements above, the superstructure must entirely enclose the rubber motor.

**15. Intermediate Stick Model.** *For event 202.* In order to be entered in the event for Intermediate Hand-Launched Stick Models, a

model must comply with all the requirements applied to indoor rubber-powered models, in addition to the following requirements.

**15.1.** All supporting and stabilizing surfaces (wing, stabilizer, and rudder) can be covered with any commercially available solid material such as plastic film or paper. Microfilm is not allowed.

**15.2.** Propellers may be carved from a solid block, formed from sheet stock, or be built-up and covered with any commercially available solid material such as plastic film or paper. Microfilm is not allowed.

**16. Autogiro.** *For event 211.* An autogiro model 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). The wing area of an Indoor Autogiro must not exceed the rotor area. Stabilizer area in excess of 50 percent of the total wing and rotor area shall count as wing area. Takeoff gear is not required. Twenty (20) seconds will define an official flight.

**17. Ornithopter.** *For event 210.* 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 not be 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 flapping parts, which would satisfy the letter of these rules while violating their spirit or intent are permitted. Takeoff gear is not required. Twenty (20) seconds will define an official flight.

**18. Helicopter.** *For event 209.* 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. Twenty (20) seconds will define an official flight.

**19. Easy B.** *For event 206.*

**19.1. General.** Except for the specific rules which apply directly to Easy B, the rules for Free Flight Indoor Rubber, Hand-Launched Stick Model, shall apply.

**19.2. Characteristics.**

**19.2.1.** The Easy B model shall be a monoplane covered with any commercially available material sold in sheet form. Microfilm is not allowed.

**19.2.2.** The maximum projected wingspan is 18 inches (45.72 centimeters).

**19.2.3.** The maximum wing chord allowed is three (3) inches (7.62 centimeters).

**19.2.4.** The motor stick shall be solid and made from a single piece of wood. The tail boom shall either be an extension of the motor stick or a separate piece of solid wood. It is permissible to use splints of wood less than 3/8-inch (0.953 centimeters) long, attached directly to the original wood, to repair structural damage to the tail boom and motor stick.

**19.2.5.** There are no restrictions on model length.

**19.2.6.** There shall be no minimum weight restrictions on the model.

**19.2.7.** Stabilizer area shall not exceed 50 percent of the projected wing area.

**19.2.8.** There shall be no bracing on the model except that which consists entirely of solid wood. The use of any material except wood for bracing on Easy B models shall not be acceptable. The intent of the Easy B rules is that all structures shall be constructed entirely from wood, using adhesives solely to assemble the structure.

**19.2.9. Propeller.** The propeller blades shall be constructed entirely from wood, with the following exception: Special novice or beginner events can be set up for local competition by permitting the use of plastic commercial propellers, provided advance notice is given in contest announcements. It is not acceptable to use any material other than wood for the propeller blades and spars, one (1) wire for the propeller shaft, and adhesive for assembly. No gadgets of any kind (such as variable-pitch or

variable diameter mechanisms) are permitted as part of the propeller. Propeller hubs which permit blade replacement and manual pitch adjustment are acceptable.

**19.2.10.** The structural framework of the Easy B model shall be entirely of wood with adhesive for assembly only. Reinforcement utilizing boron, carbon fiber, Kevlar, or any other non-wood substance is not allowed. Tissue or thread wrap at the thrust bearing and rear hook is acceptable.

**19.2.11.** It is prohibited to use any scheme, device, or mechanism which affects the rate of energy release from the rubber motor, except for propeller blade flare or deformation.

**20. Manhattan Cabin.** *For event 205.*

**20.1. General.** All rules applying to Free Flight Indoor Rubber, with the exceptions noted below, shall apply.

**20.2. Characteristics.**

**20.2.1.** Airframe weight without rubber shall be four (4) grams minimum.

**20.2.2.** The overall length of the model, measured without the prop, shall not exceed 20 inches (50.8 centimeters).

**20.2.3.** The fuselage must meet the following requirements.

**20.2.3.1.** It must support and enclose a single rubber motor. No rigid internal structures such as motor sticks allowed.

**20.2.3.2.** The external structural members of the fuselage must include a theoretical box measuring 2.5 inches x four (4) inches x two (2) inches (6.35 x, 10.16 x 5.08 centimeters), or larger.

**20.2.3.3.** The fuselage must include a windshield of two (2) square inches minimum area and a window on each side of one (1) square inch minimum; windshield and windows to be cellophane or similar transparent material. If transparent covering is used on the fuselage, then the windshield and windows must be outlined in a contrasting color.

**20.2.4.** The propeller shall be all wood except for shaft and hook for rubber attachment, with fixed pitch and directly driven by the rubber motor.

**20.2.5.** The wing shall be a monoplane with 20 inches (50.8 centimeters) maximum projected span and four (4) inches (10.16 centimeters) maximum chord.

**20.2.6.** The horizontal stabilizer shall be a

monoplane with 12 inches (30.48 centimeters) maximum projected span and 3.5 inches (8.89 centimeters) maximum chord.

**20.2.7.** Wood bracing of wing and horizontal stabilizer is allowed.

**20.2.8.** The landing gear shall be fixed and rigid with at least two (2) freely turning wheels of one (1) inch (2.54 centimeters) minimum diameter; the landing gear shall be able to support the airplane at rest on the takeoff area.

**20.2.9.** All covering of the model except for the windows shall be paper or commercially available plastic; no microfilm allowed.

**20.2.10. Scoring.** All flights shall rise off the ground from at least a two-point starting position; the best single flight of an unlimited number of official flights shall count. At the discretion of the Contest Director, the best single flight of five (5) official flights shall be counted.

## **21. Indoor Pennyplane, and Limited Pennyplane.**

*For events 207, 208.*

**21.1. General.** Except for the specific rules which apply directly to Pennyplane and Limited Pennyplane, the rules for FF Indoor Rubber and Hand Launch Stick Model, shall apply.

**21.2. Pennyplane.** *For event 207.*

**21.2.1.** The model shall weigh at least 0.109 ounces (3.10 grams) without the rubber motor.

**21.2.2.** The overall length, including the propeller, shall not exceed 20 inches (50.8 centimeters). The length is to be measured by placing the prop blade leading edges against a vertical plane. The rearmost part of the model must not extend beyond a line parallel to the vertical plane and 20 inches from it.

**21.2.3.** The projected wingspan, measured perpendicular to the motor stick, shall not exceed 18 inches (45.72 centimeters).

**21.2.4.** The distance from the front of the thrust bearing to the rear motor hook shall not exceed 10 inches (25.4 centimeters).

**21.2.5.** A single direct drive (ungeared) rubber motor and propeller shall be used to power the model.

**21.2.6.** The rubber motor shall not be enclosed.

**21.3. Limited Pennyplane.** *For event 208.*

**21.3.1.** All rules applicable to Pennyplane shall apply to Limited Pennyplane,

with the following exceptions applying specifically to Limited Pennyplane.

**21.3.2.** The wing chord shall not exceed five (5) inches (12.70 centimeters).

**21.3.3.** The dimensions of the horizontal stabilizer shall not exceed four (4) inches chord by 12 inches span (10.16 x 30.48 centimeters).

**21.3.4.** The motor stick shall be solid and made from a single piece of wood. (The tail boom may be a separate solid piece.)

**21.3.5.** The propeller diameter shall not exceed 12 inches (30.48 centimeters).

**21.3.6.** No gadgets of any kind are permitted on the model (i.e., variable pitch props, automatic incidence changing mechanisms, etc.).

**21.3.7.** Limited Pennyplane is limited to monoplane models.

## **22. Bostonian.** *For event 215.*

**22.1. General.** All rules applying to FF Indoor Rubber, with the exceptions noted below, shall apply.

**22.2. Intent of Rule.** This is an event to promote indoor flying of realistic propeller-driven, rubber-powered models of a size and complexity which are suitable for small buildings and limited skills. It also allows fanciful designs, for which no full-size counterpart exists, to be flown.

**22.3. Charisma Judging.** A “charisma factor” of 1.00 through 1.20 will be awarded each airplane before flight, based on the purpose stated above. The assignment of charisma factor will be made with all the models grouped together so they can be ranked and compared. There is no reason to award either a 1.00 or a 1.20 score to any of the models in a particular competition. These numbers represent the limits of the range to be used. The judge is encouraged to assign values with at least two (2) significant numbers to the right of the decimal point to fully use the factor to differentiate among the models being judged. This factor will be awarded with whatever weighting the appointed charisma judge sees fit and is not to be the subject of protest after judging. Argument about charisma scoring will be considered unsportsmanlike conduct with penalties provided in this book.

**22.4. Flight Scoring.** Five (5) official flights will be allowed with the sum of the best two (2), in seconds, being used as flight score. The final score will be the flight score multiplied by the charisma factor. Flight begins when the model is released for an unassisted takeoff and ends when the model next touches the floor, or is

prevented from forward flight by an obstruction for more than 10 seconds. The ten second rule will be applied in the same way as in endurance events. A flight of less than 20 seconds may be considered an attempt or an official flight (at the flier's option, to be exercised immediately) and two (2) attempts will be allowed for each of five (5) official flights. Any flight in which there is accidental contact with steering apparatus, people, or other models may be considered no-flight (at the flier's option, to be exercised immediately) with neither an official flight nor an attempt being recorded. A flight in which the model does not take off or is assisted in takeoff is listed as a zero (0) time attempt. A bounce caused by roughness of the takeoff surface or a liftoff with a stall and no climb is not to be considered a takeoff. Hand launching may be used if, in the opinion of the Contest Director, floor surface conditions are likely to prevent a significant number of the entries from rising off the ground.

**22.5. Timing.** All flights must begin with release for unassisted takeoff from a position in which the model is resting on the takeoff (landing) gear with no push allowed. If the flier's hand moves in the direction of flight on release, this will be interpreted as a push and a zero (0) time attempt will be charged.

**22.6. Specifications.**

**22.6.1.** Maximum projected wingspan shall not exceed 16 inches (40.64 centimeters).

**22.6.2.** Maximum wing chord (measured parallel to the direction of flight) shall not exceed three (3) inches (7.62 centimeters).

**22.6.3.** The diameter of the propeller(s) shall not exceed six (6) inches (15.24 centimeters).

**22.6.4.** The length of the model, excluding the propeller(s), but including the thrust bearing(s), shall not exceed 14 inches (35.56 centimeters). This measurement will be made in the direction of flight and will include surfaces which extend beyond the thrust bearing or fuselage end because of a sweep or unusual mounting.

**22.6.5.** The fuselage structure must enclose an imaginary box which has minimum dimensions of 1.5 inches x 2.5 inches x 3.0 inches (3.81 centimeters x 6.35 centimeters x 7.62 centimeters). The width (the horizontal dimension perpendicular to the line of flight) of the fuselage shall not exceed three (3) inches. The fuselage must be covered to prevent 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.

**22.6.6.** The fuselage structure must be built-up so that the longitudinal members (the longerons) support the forces produced by the rubber motor. A solid or hollow motor stick with a lightweight structure added on is not acceptable.

**22.6.7.** The fuselage must have a transparent windshield and side windows of at least one (1) square inch (6.45 square centimeters) 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 need not have side windows, but the windshield must meet the one (1) square inch rule (6.45 square centimeters) and must stand at least 3/4 inch (1.905 centimeters) above the top part of the fuselage ahead of the cockpit.

**22.6.8.** The model must have at least two (2) wheels of at least 3/4-inch (1.905 centimeters) diameter which rotate freely and support the model for takeoff and landing. The inside surfaces of the wheels must be separated by at least 2.5 inches (6.35 centimeters) in the direction of the axis of the wheels.

**22.6.9.** 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

**22.6.10.** To qualify as a monoplane, the total projected area of the secondary horizontal surface(s), excluding that inside the fuselage, shall not exceed 24 square inches (152.8 square centimeters). This may be a conventional stabilizer and/or a canard surface. Secondary horizontal surfaces exceeding this total area limit will be considered to be additional wings.

**22.6.11.** The airframe, excluding the rubber motor(s), shall weigh at least seven (7) grams for a monoplane or 10 grams for others. These weights may be increased at the discretion of the Contest Director if advanced notice is given to contestants. No trim tabs or other appendages which result in specified dimensions being exceeded, will be allowed.

**22.7.** Only one (1) entry per contestant is allowed.

**23. Kit/Plan Scale.** *For event 213.*

The intent of this event is to foster flying of Free

Flight Scale rubber-powered Indoor models by providing an event which requires a minimum of research, documentation and design and offers a maximum of flying. A secondary objective is the encouragement of kitting and publication of good designs by requiring that the models flown are built up and finished according to the designs used, so that the better designs will be recognized by their success in contests.

**23.1.** Models must be built from published plans or kits which represent real, man-carrying aircraft. Kit materials may be replaced in kind. That is, hardwood parts will be replaced by hardwood, balsa by balsa, etc.

**23.2.** Size of plans may be reduced or enlarged if wood sizes are in proportion to the original.

**23.3.** All surfaces must be covered on both sides with tissue paper. No condenser paper or films are allowed. Uncovered solid materials may be used.

**23.4.** Models must take off unassisted for official flights.

**23.5.** Any flight in which the model is airborne for more than ten (10) seconds is official.

**23.6.** Two (2) attempts may be used for each of five (5) official flights.

**23.7.** Timing starts when the model is released and terminates when the model next touches the floor or comes to rest after takeoff. The ten-second hang up rule as described in Section 9, Timing of Flights, will be used.

**23.8.** No flight score (in whole seconds) will exceed the total of Craftsman and Fidelity points.

**23.9.** Each contestant is limited to one entry. Models will be judged before they are flown. Plans and instructions from which the model was built must be submitted. Up to 60 points will be awarded for fidelity of the model to the plans and/or printed instructions from which it was built. Any changes in the structure or finish will result in a penalty of one (1) or two (2) points, depending on the nature of the change. If the change is made in several places, the penalty will be assessed for each place. In cases of disagreement between the plans and instructions, the builder must select which of the options he will use and highlight it on the plans or instruction sheet which he submits to the judges. In cases where the plans and/or instructions do not show how something is done, the builder is free to improvise. Also, see 23.11 and 23.14.

**23.10.** Up to 40 points will be awarded for craftsmanship, based on workmanship and finish. Visible rough finish, poorly fitted joints, wrinkled and puckered tissue, poorly located or attached decorations should all result in one (1) or two (2) penalty points for each infraction. Surfaces which are warped or tissue which is puckered because of inadequate or poorly designed structure should be penalized lightly. Also, see items 23.12 and 23.13 below.

**23.11.** Nose block and rear rubber attachment method may be altered to allow stretch winding, insertion of a winding tube and easy hook up without penalty.

**23.12.** Tissue type and color are optional, but control outlines and registration numbers (even if made up).

**23.13.** Decorations or paper panels which are supposed to be cut from the plan and glued to the model must be so done, but they may be reproduced on similar weight paper and cut out to preserve the plan.

**23.14.** Propeller and thrust bearing may be altered from the plan without penalty.

**23.15.** Final score is the sum of the best two (2) flight scores plus Craftsmanship plus Fidelity.

**24. Mini-Stick.** *For event 220.*

**24.1.** The intent of this proposal is to make Mini-Stick an official event to allow including the event in AMA contests, to increase participation, and to allow records to be more easily kept.

**24.2.** The Mini-Stick model shall be a monoplane covered with any commercially available material sold in sheet form. Microfilm is not allowed.

**24.3.** The maximum projected wingspan shall be seven (7) inches.

**24.4.** The maximum wing chord shall be two and one-half (2 1/2) inches.

**24.5.** The maximum length (from front of nose bearing to front of rear motor hook) shall be five (5) inches.

**24.6.** The maximum length from front of nose bearing to rear most part of model shall be ten (10) inches.

**24.7.** The projected area of the stabilizer shall not exceed 50% of the projected area of the wing.

**24.8.** The maximum diameter of the propeller shall be seven (7) inches. The propeller shall be constructed of wood. Wire shafts are permitted. Hubs that allow blade replacement and/or manual pitch adjustment are allowed. Mechanisms that cause variable pitch and/or



variable diameter of propellers while in flight shall not be allowed. (Natural flexing and flaring of wooden blades is allowed.)

**24.9.** The minimum overall weight of the model (without motor) shall be 0.015 ounce.

#### FAI STEERING RULE

a. Steering must only be used to avert collision with the structure of the building, its contents, or other models. Movements of the model must be primarily in the horizontal plane.

*Note: If, in the timekeeper's opinion, a model's altitude change is approaching one-half meter, or one (1) meter for each 25 meters of altitude (whichever is larger), he will warn the competitor. Continued disregard of the timekeeper's warning will result in a terminated flight.*

b. A balloon(s) with its line attached, or a rod may be used to alter the course of the model, or to reposition it in another part of the flying space. There will be no time limit or restriction to the number of steering attempts, except that all steering shall be done from the front end of the model and never from behind.

c. During the steering, the propeller may get caught by the line/balloon(s)/rod and stop revolving. As soon as the propeller stops, a third watch should be used (preferably a double button watch, that records cumulative time) to determine the total propeller stopped time, which is deducted from the running total shown on the other two (2) watches.

If the steerer cannot disengage the propeller after steering, all three (3) watches are to be stopped together, and the total prop-stopped time deducted as is detailed above.

d. No re-flight is allowed other than if fouled by another model during steering.

e. The decision to steer is the responsibility of the competitor and must be done by him. A physically handicapped competitor must arrange for a substitute with the contest officials. In the case of poor sight, a medical doctor's affidavit certifying that the competitor's corrected vision is no less than 20/40 for the better eye must be submitted to permit a substitute steerer.

f. It is the timekeeper's responsibility to observe the use of the steering equipment and to warn the competitor if he is likely to endanger other models. If other models are fouled by the steerer, the fouled competitor has the choice of a substitute flight, which, if taken, is his score for that round. He must exercise this choice to his timekeepers not later than two (2) minutes after termination of his flight. If he chooses to restart, he must do so before his next official flight.

**24.10.** Construction is to be primarily wood, with adhesives used only for joining. Tissue and/or thread is permitted for wrapping bearings, hooks, and for making sockets, if desired. Boron, carbon fiber, Kevlar, and fine wire bracing are not permitted.

**24.11.** Mechanisms that restrict the torque available to the propeller are not allowed.

**25. Experimental Autogiro (Provisional).** For event 216.

**25.1. General.** All rules applying to FF Indoor Rubber, with the exceptions noted below, shall apply.

**25.2.** An Experimental Autogiro model is supported in flight solely by the action of vanes or rotor(s) which rotate freely on an approximately vertical axis. No fixed wing(s) may be used.

**25.3.** The area of the lifting surface is defined as the swept disc area of the vanes or rotor(s). This area is computed by multiplying

3.14 times the square of the radius of the rotor or rotors. If more than one (1) rotor is used, the lifting surface is the sum of the individual swept disc areas.

**25.4.** Each individual vane or rotor blade must have an aspect ratio no less than 4:1. The aspect ratio is computed by dividing the rotor diameter by twice the average vane width.

**25.5.** The total area of all horizontal stabilizing surfaces shall not exceed 10 percent of the total lifting surface. No limit is placed on the area of vertical stabilizing surface(s). If a “V-tail” configuration is used, the horizontal lifting surface is defined as the projected area of the V-tail surface.

**25.6.** Scoring for Experimental Autogiros shall conform to the provisions of sections 9 and 10 of the AMA Indoor Rubber rules.

**25.7.** The intent of this rule is to encourage experimental development of wingless autogiros.

**26. A-6. For event (222 )**

**26.1. General.** Except for the specific rules which apply directly to A-6, the rules for Free Flight Indoor Rubber, Hand Launched Stick model shall apply.

**26.2.** The model shall be rubber powered and covered with paper.

**26.3.** The total maximum projected wing area shall be 30 square inches. There is no restriction on the stabilizer area.

**26.4.** All wing, stabilizer and rudder wood including wing posts shall be 1/16” square wood minimum, except ribs shall be 1/32” X 1/16” minimum. Posts may be rounded in the area of the mounting tubes.

**26.5.** The motor stick shall be from solid wood of 6” maximum length measured from the front thrust bearing face to the front of the rear hook.

**26.6.** The propeller shall be 6” maximum diameter with flat blades from balsa no thinner than 1/32”.

**26.7.** The minimum weight of the model shall be 1.2 grams without rubber motor.

**26.8.** No special materials such as boron, carbon fiber or foam are to be used.

**HAND LAUNCHED GLIDER AND HAND LAUNCHED GLIDER AND CATAPULT GLIDER**

*For events 212, 218, 219.*

**1. Applicability.** All pertinent AMA regulations (see sections titled Sanctioned Competition, Records, Selection of Champions, and General) shall be applicable, except as specified below.

**2. General.** An Indoor Glider is a non-powered model aircraft designed to fly indoors.

**3. Classes.** The following classes shall be recognized for competition and National Records.

- a. Hand-Launched Glider.
- b. Standard Class Catapult Glider.
- c. Unlimited Class Catapult Glider.

**4. Size of Supporting Surfaces.** 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 stick shall not be considered as wing area. Projected area of horizontal stabilizing surface(s) in excess of 50 percent of the projected area of the supporting surface (wing area) shall be considered as wing area.

**a. Hand-Launched Glider.** The projected area of the supporting surface(s) must not be more than 100 square inches.

**b. Standard Class Catapult Glider.** The projected wing span must not exceed 12 inches. The projected wing chord shall not exceed three (3) inches. The area of the horizontal stabilizing surface(s) shall not exceed 50 percent of the projected wing area. Standard class is limited to monoplanes.

**c. Unlimited Class Catapult Glider.** The projected area of the supporting surface(s) must not be more than 100 square inches.

**5. Construction.** All surfaces shall remain fixed except for changes of camber or incidence due to natural flexing of the surfaces. Folding wings and mechanically actuated incidence changes are strictly prohibited.

**6. Launching.** Launching shall be appropriate to the class of model. In all cases, the launch shall be made with force sufficient to cause the glider to immediately gain altitude equal to three (3) times the flier’s height or half the available ceiling height, whichever is less. The model shall not be launched from a height greater than the flier’s normal reach above the floor.

**a. Hand-Launching.** The model shall be released into flight directly from the hands of the contestant, without other assistance.

**b. Catapult Launching.** The model is launched by stretching elastic band(s) between the hands of the contestant, with one end(s) firmly attached to a launching handle. The handle shall consist of a rigid dowel or similar device, with the elastic band(s) firmly attached. The launching handle (including the attachments for the elastic) shall not exceed six (6) inches in length, measured along the longest dimension. The handle may use padding or contoured grips for flier comfort. There is no limit to the length or sizes of the elastic bands. All launching apparatus must remain firmly attached to either the handle or the model during launch. There is no limit to the number of launching handles a contestant may use to complete his/her flights.

**7. Number of Gliders.** Each contestant shall be permitted a maximum of three (3) gliders per contest. The three (3) gliders used may be of different design.

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

**9. Number of Flights.** Each contestant shall be allowed a total of nine (9) official flights.

**10. Scoring of Flights.** Scoring time shall be the total elapsed time of the best two (2) of not more than nine (9) official flights. Flight duration shall be scored in tenths of seconds, with hundredths of a second dropped. Example: 65.17 seconds shall be recorded as 65.1 seconds.

**11. Flying for Record.** The same ceiling height categories and specifications apply as for Indoor Rubber models.

## **FREE FLIGHT ELECTRIC POWER**

*For event 221.*

**1. Model Specifications:** The models shall be powered by no more than one (1) 10 mAh LiPo cell and may weigh no more than 10 grams. An electronic speed control, adjusted on the model and run by the same LiPo cell, is permitted. No remote control equipment is allowed. There shall be no other restrictions on model size or configuration.

**2. Scoring.** Scoring shall be the longest of not more than five (5) official flights. An official

flight is defined by Section 7 of the Free Flight Indoor Rubber rules.

**3. Timing.** Time shall be recorded in minutes and seconds with fractions of seconds dropped. Timing shall begin when the model is hand-launched and ends when the model touches the floor or contacts any part of the building and ceases traditional movement for longer than 10 seconds.