

NZMAA FLYING RULES

Section 6: Free Flight and Control Line Scale

TECHNICAL RULES FOR FLYING SCALE MODEL CONTESTS

6.1 GENERAL RULES AND STANDARDS FOR STATIC JUDGING OF SCALE MODELS

6.1.1 Definition of Scale Models:

A scale model shall be a reproduction of a heavier-than-air fixed wing, man-carrying aircraft.

Note: To indicate the subject full-size aircraft being scale modelled, the word "prototype" is always used.

6.1.2 System of Rules:

Rules are numbered as follows:

- 6.1 General rules and standards for judging Fidelity to Scale
- 6.2 Control Line Scale Models – Class F4B
- 6.3 Indoor Rubber Scale Models - Class F4D
- 6.4 Outdoor Rubber Scale Models
- 6.5 Indoor CO₂ or Electric Motor powered Free Flight Scale Models - Class F4E
- 6.6 Indoor Peanut Formula Free Flight Scale Models - Class F4F
- 6.7 Outdoor Power Free Flight Scale Models
- 6.8 Outdoor CO₂, Jetex, or Electric Motor powered Free Flight Scale Models

6.1.3 Competition Programme:

Part 6.1 (Static Judging) shall precede the flying programme, except when the entry exceeds 30 models, in which case the flying will commence on the first day of the competition. The CD will decide and announce when the static judging will take place in relation to flying.

6.1.4 Judges:

For International events, the organiser of flying scale competition shall appoint three scale judges who shall determine the degree of fidelity to scale and craftsmanship and a panel of at least three flight judges, who shall preferably each be of a different nationality, and shall be selected from a list submitted by their National Aero Club and approved by the CIAM.

In the case of World Championships, the panel of flight judges must be increased to five and at least one member of the respective CIAM sub-committee shall be included in each panel. The two panels of judges must be approved by the CIAM Bureau prior to the World Championships.

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If two separate judges panels are used (for static and flight judging respectively), flying should commence when approximately half of the models have been static judged.

The static judges must have a common language.

6.1.5 Coefficient:

Where a K - factor (K) is noted, scoring shall be from 0 to 100. The score shall be divided by 10 and then multiplied by the K - factor (K).

6.1.6 Remarks:

- a] All models shall become airborne in the manner of their prototype. Hand launching will be permitted at a sacrifice of the total take-off points.
- b] Models of seaplanes of all classes are permitted to use wheels or wheeled dollies for take-off in the absence of suitable water surface conditions. Deviation from Scale through inclusion of permanently attached wheels, skids or similar non-prototype devices in the model structures shall be in this case not taken into consideration in the scoring of Fidelity to Scale and Craftsmanship.
- c] No parts of a model may be added or removed between scale judging and flying.
- d] A flying propeller of any form or diameter may be substituted for a scale propeller. The size and shape of the spinner may not be changed.
- e] Metal bladed flying propellers are forbidden.
- f] The release or dropping of a dolly immediately after take-off shall not be considered as jettisoning.
- g] Explosives may not be dropped.
- h] If the pilot of the prototype is visible from the front or from the side during flight, a dummy pilot of scale size and shape shall be equally visible during flight in the model.

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If such a pilot is not fitted the K - factor for "realism in flight" shall be reduced to 8 for Control Line and to 20 for Free Flight events.

- l) When jettisoning of any part of the model occurs [except under 6.2.7.3 to 7 and 6.2.8. l) to n)] the scoring shall cease from that point onwards, including the figure in which it occurred.
- jj) A measurement of weight must be undertaken immediately after the first flight of each competitor.
- k) A measurement of noise must be undertaken at least once during the competition. See for details 6.2.1.

6.1.7 Number of Models:

Each competitor may compete only with one model in any one category.

6.1.8 Helpers:

A competitor may have one assistant during an official flight except for assisting in starting the engine(s), but if the model is of a multi-engine prototype, the competitor may have two helpers.

6.1.9 Proof of Scale:

6.1.9.1 Proof of scale is the responsibility of the competitor.

6.1.9.2 Name of Entry:

Exact name and model designation of subject aircraft shall be indicated on the entry blank and in the "Proof of Scale" presentation.

6.1.9.3 The scale to which the model is built is optional, but must be stated in the "Proof of Scale" presentation.

6.1.9.4 To be eligible for Fidelity to Scale points the following documentation must be submitted to the judges.

a) An accurate 3-view scale drawing or colour drawing of the full-size aeroplane having a minimum scale of 1/82, or a minimum span of 150 mm, and a maximum scale of 1/24 or maximum span of 500 mm. The drawing must be submitted in duplicate. The second copy must be of the same size and can be in black and white. A selection of photographs can replace the 3-view drawing or early aircraft for which no drawing may exist.

b) Colour drawings from authentic sources, e.g. "Profile" type publications (including three views) are acceptable for proof of colour. An authenticated written or printed description is also acceptable. Home made drawings by the competitor or other draftsman are not acceptable unless certified accurate in advance of the contest by an authoritative source such as the respective National Scale Committee or equivalent, builder of original

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aircraft, or other competent authority. Proof of the cruising speed must be given.

c] At least three (3) photos or printed reproductions of the prototype, including at least one of the actual subject aircraft being modelled.

d] The competitor should supply a declaration listing all components of the model he did not make himself. The competitor should also sign a declaration that he is the builder of the model entered. If found in violation the competitor may be disqualified from the contest.

6.1.10 Judging for Fidelity to Scale and Craftsmanship

		K - Factor
1.	Scale Accuracy	
	Side view	10
	End view	10
	Plan view	10
2.	Colour	3
3.	Markings	6
4.	Surface texture and realism	8
5.	Craftsmanship.....	10
6.	Scale detail	<u>8</u>
	Total	65

Items 1-3 to be judged first at a minimum distance of 3 m from the model. Items 4-6 to be judged at a minimum distance of 1 m from the model.

6.1.11 Scoring:

For Flying Scale Contests the combined Fidelity to Scale and Craftsmanship points shall be the aggregate sum of points awarded by the three judges. These points can be used for final classification only when the model completes an official flight.

6.2 CLASS F4B - CONTROL LINE FLYING SCALE MODELS

6.2.1 General Characteristics:

Maximum surface area: 150 dm²

Maximum weight: The weight of the complete model without fuel shall not exceed 6 kg (except a model of a prototype using more than one motor which shall not exceed 7 kg).

Maximum loading: 150 g/dm²

Motive Power:

a] Piston motors: The total swept volume of the motor or motors shall not exceed 10 cm³ (two stroke) or 20 cm³ (four stroke), except that in a model of a prototype using more than one motor, the total swept volume of the motors shall not exceed 20 cm³ (two stroke) or 40 cm³ (four stroke).

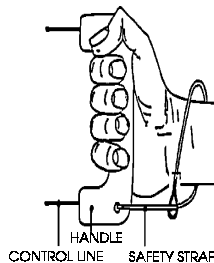
- b] Jet reaction motors (Rockets excluded): Maximum outside diameter of the combustion chamber: 80 mm. The maximum thrust for a turbine motor shall be 10kg.
- c] Electric motors: maximum no-load voltage of power source 42 volts.

The maximum noise level will be 96 dB(A) measured at 3 m from the centre line of the model with the model placed on the ground over concrete or macadam at the flying site. With the motor running at full power, measurement will be taken 90 degrees to the flight path on the side chosen by the competitor and downwind from the model. The microphone will be placed on a stand 30 cm above the ground in line with the motor(s). No noise reflecting objects shall be nearer than 3m to the model or microphone. The noise measurement will be made prior to each flight. If a concrete or macadam surface is not available then the measurement may be taken over bare earth or very short grass in which case the maximum noise level will be 94 dB(A). In the case of multi-engine models, the noise measurement will be taken at 3 metres from the closest engine to the noise meter and the maximum noise level will be the same as for single engine models.

In the event a model fails the noise test, no indication shall be given to the pilot and/or his team, or the judges, and the model shall be impounded by the flight line official immediately following the flight. No modification or adjustment to the model shall be permitted (other than refuelling). The model shall be retested by a second noise steward using a second noise meter and in the event that the model fails the retest, the score for the preceding flight shall be zero. The flight time will be interrupted while the noise check at the flying site is being made. The competitor shall not be delayed more than 30 seconds for the noise check. The sonometers will be of good quality with a test system (reference noise).

6.2.2 Control Mechanism:

Before each flight the entire control mechanism including control line and their attachments to the model and the control handle, shall be subject to a pull test equal to 10 times the weight of the model with a maximum of 35 kg. Control line length (central point of hand grip to vertical centre line of model), shall be not less than 12 metres or more than 21.5 metres. A safety strap connecting the competitor’s wrist to the control handle must be provided by the competitor.



6.2.3 Definition of an Attempt:

Each competitor is entitled to one attempt for each official flight.

There is an attempt when the competitor is given permission to start.

Note: If the model fails to commence the takeoff within the 5 minutes, plus one minute for each additional motor, the competitor must immediately make room for the next competitor. If the motor(s) stops after the takeoff has begun, but before the model is airborne it may be restarted within the 5 minutes starting period.

Note: An attempt can be repeated at the judges' discretion only when, for any unforeseen reason outside the control of the competitor or organisers, the model fails to start.

6.2.4 Definition of an Official Flight:

A flight is considered official when the model has been airborne for 60 or more seconds. Model must not commence optional demonstrations before completion of five laps, during which the model must not touch the ground.

6.2.5 Number of Flights:

Each competitor is entitled to complete three official flight programs.

6.2.6 Flying Time:

Competitors must be called at least 7 minutes before they are required to occupy starting area. Each competitor shall have 9 minutes to complete each flight programme. Time shall start when competitor begins to crank motor or two minutes after entering the starting area, whichever is first. Model must become airborne within the first five minutes (plus one minute for each additional motor, in excess of one). No points may be scored after the expiration of the time limit (9 minutes plus one minute for each added motor).

6.2.7 Flight:

- 6.2.7.1 Take-offK = 8
- 6.2.7.2 Realism in flightK = 10

Note: The scale of the model and the cruising speed of the prototype must be stated on the flight scoring form.

- 6.2.7.3 Optional demonstration.....K = 7
- 6.2.7.4 Optional demonstration.....K = 7
- 6.2.7.5 Optional demonstration.....K = 7
- 6.2.7.6 Optional demonstration.....K = 7
- 6.2.7.7 Optional demonstration.....K = 7
- 6.2.7.8 Landing.....K = 7
- 6.2.7.9 Taxi demonstrationK = 5

(Minimum distance one round to the starting point)
This manoeuvre should be executed at the termination of the flight.

6.2.8 Optional Demonstrations:

The competitor shall give evidence that the options selected are typical and within the normal capabilities of the aircraft subject type modelled.

Optional selections must be announced to judges in writing before take-off.

The five optional demonstrations shall be selected from the following list:

- a] Multi-motor option
All motors must be running at take-off and shall continue to run for at least five laps K = 7

Note: K = 7 applies to all multi-motor subjects; no points are awarded for each individual motor.

- b] Retract and extend landing gear K = 7
- i] Figure eight K = 7
- j] Touch and go K = 7
- k] Throttle control K = 7
- l] Parachute drop K = 7
- m] Flight function by subject aircraft K = 7
- n] Flight function by subject aircraft K = 7

(Contestant may demonstrate two flight functions of his own choice, provided the second is different from the first).

The options may be flown in any order but the competitor must indicate his flight plan to the judges before the flight.

Note: Not more than two drop options may be nominated.

6.2.9 Marking (flight points):

Each manoeuvre may be awarded marks between 0 and 10 by each judge during the flight. The marks are multiplied by a coefficient, which varies with the difficulty of the manoeuvres.

6.2.10 Flight Score:

Flight score shall be the aggregate sum of points awarded in 6.2.7 by the three judges. At World and Continental Championships or whenever using five judges, delete the highest and lowest score for each manoeuvre, to make three judges only to count.

6.2.11 Final Scoring:

Add points earned in 6.1.12 and the average score of the two best flights under 6.2.7. If the competitor has achieved only one flight, the points awarded for that flight will be divided by two.

6.2.12 PROFILE SCALE CONTROL LINE FLYING RULES

6.2.12.1 General

6.2.12.1.1 General rules and standards for static judging as under 6.1 apply.

6.2.12.1.2 Refer to 6.2.1 to 6.2.12 for FAI F4B class.

6.2.12.2 Profile Scale Class (Novice)

6.2.12.2.1 This is intended as an introductory class for newcomers to competition flying where the fuselage has a true side view outline, constructed in solid (not built-up framework) style with minimum cross sectional width. All other outlines shall be true to scale. Documentation for models in this class shall be as required for scale free flight power class section 6.7 of these rules.

6.2.12.2.2 Control Lines, Mechanisms, Load Tests shall be as for class F4B.

6.2.12.2.3 Flight judging as for class F4B except that reference to retracting undercarriage shall not apply.

6.2.12.2.4 Static judging shall be as for class F4B except that scale detail shall not apply.

**6.3 CLASS F4D - INDOOR FREE FLIGHT SCALE MODELS
POWERED BY EXTENSIBLE MOTORS**

General rules and standards for static judging as under 6.1 apply with the following amendment:

Minimum judging distances to read 1.5m and 0.5m instead of 3m and 1m (Note 6.1.6a shall also apply).

6.3.1 General Characteristics

- Maximum flying weight: 150gm
- Maximum wing loading: 15gm/dm²
- Motor power: Extensible motor(s) only

6.3.2 Definition of an Official Flight

An official flight shall be recorded when the model has been airborne for 15 seconds.

6.3.3 Number of Flights

Each competitor shall have the opportunity to make a minimum of four flights.

6.3.4 Flying Time

A minimum period of 15 minutes shall be allocated for trimming before the competition begins, and the competitor must be called 5 minutes before he/she is required to occupy the starting area. Failure to comply will result in loss of the flight. The model will be released upon instruction from the flight judges within a period of 3 minutes, plus 1 minute for each additional motor. Only one release is permitted during the allocated time.

6.3.5 Judging for Flight Realism

5.1	Take-off	K = 10
5.2	Initial climb.....	K = 8
5.3	Descent and landing approach.....	K = 12
5.4	Quality of landing.....	K = 11
5.5	Realism in flight	<u>K = 24</u>
	Total.....	K = 65

6.3.6 Complexity Bonus

The flight shall be subject to a complexity bonus as listed in the following schedule. All bonuses are additive. The best flight score shall be factored by the appropriate total bonus to become the scoring flight.

Propellers (on different thrust lines)	% bonus
Single	0
Two or more	15

Note that each propeller must contribute significantly to the total thrust.

Undercarriage	% bonus
Fixed (any configuration)	0
Retractable (remains up for landing)	10
Retractable (lowers again for landing)	20

6.3.7 Marking (Flight Points)

Each part of the flight, as defined in 6.3.5 will be awarded marks between 0 and 10 by each judge during the flight. These marks are then each multiplied by the appropriate K factor and aggregated before the bonuses are applied as described in 6.3.6.

6.3.8 Flight Score

The flight score shall be the aggregate sum of points awarded by the judges as described in 6.3.6 and 6.3.7.

6.3.9 Total Score

Add the points earned in 6.1.12 to the best flight score as defined in 6.3.8.

**6.4 OUTDOOR FREE FLIGHT SCALE MODELS
POWERED BY EXTENSIBLE MOTORS (Eg. Rubber)**

General rules and standards for static judging as under 6.1 apply with the following amendment.

Minimum judging distances to read 1.5m and 0.5m instead of 3m and 1m (Note 6.1.6a shall also apply).

6.4.1 General Characteristics

- Maximum flying weight: 2kg
- Minimum wing span: 38 cm
- Motor power: Extensible motor(s) only

6.4.2 Definition of an Official Flight

An official flight shall be recorded when the model has been airborne for 15 seconds.

6.4.3 Number of Flights

Each competitor shall have the opportunity to make a minimum of four flights.

6.4.4 Flying Time

A minimum period of 15 minutes shall be allocated for trimming before the competition begins, and the competitor must be called 5 minutes before he/she is required to occupy the starting area. Failure to comply will result in loss of the flight. The model will be released upon instruction from the flight judges within a period of 3 minutes, plus 1 minute for each additional motor. Only one release is permitted during the allocated time.

6.4.5 Judging for Flight Realism

5.1	Take-off	K = 10
5.2	Initial climb.....	K = 8
5.3	Descent and landing approach.....	K = 12
5.4	Quality of landing.....	K = 11
5.5	Realism in flight	<u>K = 24</u>
	Total	K = 65

6.4.6 Complexity Bonus

The flight shall be subject to a complexity bonus as listed in the following schedule. All bonuses are additive. The best flight score shall be factored by the appropriate total bonus to become the scoring flight.

Propellers (on different thrust lines)	% bonus
Single	0
Two or more	15

Note that each propeller must contribute significantly to the total thrust.

Undercarriage	% bonus
Fixed (any configuration)	0
Retractable (remains up for landing)	10
Retractable (lowers again for landing)	20

6.4.7 Marking (Flight Points)

Each part of the flight, as defined in 5 will be awarded marks between 0 and 10 by each judge during the flight. These marks are then each multiplied by the appropriate K factor and aggregated before the bonuses are applied as described in 6.4.6.

6.4.8 Flight Score

The flight score shall be the aggregate sum of points awarded by the judges as described in 6.4.6 and 6.4.7.

6.4.9 Total Score

Add the points earned in 6.1.12 to the best flight score as defined in 8.

**6.5 CLASS F4E - INDOOR FREE FLIGHT SCALE MODELS
POWERED BY CO₂ OR ELECTRIC MOTORS**

General rules and standards for static judging apply as under 6.1 with the following amendment.

Minimum judging distances to read 1.5m and 0.5m instead of 3m and 1m (Note: 6.1.6a shall also apply).

6.5.1 General Characteristics

Maximum flying weight: 150gm

Maximum wing loading: 15gm/dm²

Motive power:

- a] Commercially produced reciprocating motors driven by carbon dioxide gas with the gas storage tank carried on the model, or
- b] Electric motors with the batteries carried in the model.

6.5.2 Definition of an Official Flight

An official flight shall be recorded when the model has been airborne for 15 seconds.

6.5.3 Number of Flights

Each competitor shall have the opportunity to make a minimum of four flights.

6.5.4 Flying Time

A minimum period of 15 minutes shall be allocated for trimming before the competition begins, and the competitor must be called 5 minutes before he/she is required to occupy the starting area. Failure to comply will result in loss of the flight. The model will be released upon instruction from the flight judges within a period of 3 minutes, plus 1 minute for each additional motor. Only one release is permitted during the allocated time.

6.5.5 Judging for Flight Realism

5.1	Take-off	K = 10
5.2	Initial climb.....	K = 8
5.3	Descent and landing approach.....	K = 12
5.4	Quality of landing.....	K = 11
5.5	Realism in flight	<u>K = 24</u>
	Total.....	K = 65

6.5.6 Complexity Bonus

The flight shall be subject to a complexity bonus as listed in the following schedule. All bonuses are additive. The best flight score shall be factored by the appropriate total bonus to become the scoring flight.

Propellers (on different thrust lines)	% bonus
Single	0
Two or more	15

Note that each propeller must contribute significantly to the total thrust.

Undercarriage	% bonus
Fixed (any configuration)	0
Retractable (remains up for landing)	10
Retractable (lowers again for landing)	20

6.5.7 Marking (Flight Points)

Each part of the flight, as defined in 5 will be awarded marks between 0 and 10 by each judge during the flight. These marks are then each multiplied by the appropriate K factor and aggregated before the bonuses are applied as described in 6.

6.5.8 Flight Score

The flight score shall be the aggregate sum of points awarded by the judges as described in 6 and 7.

6.5.9 Total Score

Add the points earned in 6.1.12 to the best flight score as defined in 8.

6.6 CLASS F4F - PEANUT FORMULA INDOOR FREE FLIGHT SCALE MODELS

General rules and standards for static judging as under 6.1 shall not apply except for the following:

- 6.1.7 Number of models
- 6.1.9.2 Name of entry

6.6.1 Definition of Peanut Formula Scale Models:

A Peanut Formula scale model shall be a reproduction of a heavier-than-air man carrying aircraft.

6.6.2 General Characteristics:

Maximum dimensions: 33cm span or 23cm overall length excluding the propeller.

Motive power: Extensible motor(s) only.

6.6.3 Documentation:

The minimum documentation is as follows:

Either a general arrangement drawing of at least 5cm wing span, plus one photograph of the aeroplane reproduced, or a coloured 3-view to a minimum of 1/144th scale.

6.6.4 Flying Section:

Each competitor is allowed a minimum of 4 official flights, with two attempts per flight (an attempt is less than 5 seconds duration). The times of the longest two flights will be aggregated to form the competitor's flight score. Flights may be hand launched or from take-off. If take-off is successfully achieved, without pushing or similar assistance, then 10 seconds will be added to that flight time recorded.

6.6.5 Appearance Score:

Models will be judged visually, in comparison with the documentation provided, by one or more judges. No measurements will be taken. Marks will be awarded as follows:

- a] Workmanship0 – 15
- b] Complexity and Accuracy of colour and markings0 – 10
- c] Authentic details0 – 5
- d] Flying surfaces:
 - All double covered4
 - Double covered wing but single covered tail2
 - Single sheet.....1

Single surface 0
 Note: If however the prototype was single covered, then the model should be likewise single covered and be awarded the full 4 points.

- e] Surface Finish:
 - Painted colour 5 – 9
 - Unpainted colour tissue 4
 - Unpainted Condenser paper 3
 - Microfilm 0

- f] Landing gear:
 - Scale length 3
 - Slightly enlarged 2
 - Greatly enlarged or no documentation 1
 - None or retracted 0

- g] Dihedral:
 - Scale 3
 - Slightly exaggerated 1
 - Grossly exaggerated or no documentation 0

- h] Stabiliser outline:
 - Correct size and shape 3
 - Correct size, wrong outline 2
 - Enlarged 1
 - Grossly enlarged 0

- i] Bonus points for complexity:
 - Low wing 9
 - Biplane 9
 - Triplane 15
 - Autogiro 21
 - Helicopter 27
 - Flying boat or floatplane 9
 - Scale number of wing ribs 2 per wing
 - Scale number of tailplane ribs 1
 - Scale number of rudder ribs ½
 - Separate ailerons 1
 - Separate rudder ½
 - Separate elevator or all-moving tailplane ½
 - Other than square fuselage 1
 - Wheel spats or pants 1
 - Three dimensional pilot 1
 - Exposed engine 0 – 5
 - Flying wing 8
 - Other than rectangular fuselage 5
 - More than one motor on different thrust lines 5

- j] Negative points for deviation from scale to assist flying performance:
 - Lengthening of nose or tail moment 2 each
 - Moving wing back 2

Simplifying fuselage cross-section	2
Enlarging rudder	2
All other non-scale performance aids	2 each

The competitor's appearance score will be the sum of the marks awarded in 6.6.5 (a) through 6.6.5 (j).

6.6.6 Scoring:

The order of marking in 6.6.3 and 6.6.4 will produce a "place" in the Flying and Appearance sections respectively. Each competitor's numerical "places" in the two sections are added. The lowest overall totals then determine the final overall placings in the competition. A fly-off in which the realism of flight is the determining factor (marked to section 6.5.5) will be held, if necessary, to break ties in the final placing of the leaders. In the event of a tie for appearance or flying, the next lower position receives a "place" one greater than the total number of competitors ahead of him.

6.7 POWER FREE FLIGHT SCALE MODELS

General rules and standards for static judging apply as under 6.1 with the following amendment:

Minimum judging distances to read 1.5m and 0.5m instead of 3m and 1m (Note: 6.1.6a shall also apply).

6.7.1 General Characteristics

Maximum flying weight: 2 kg

Maximum wing loading: 20gm/dm²

Motive power:

- a] Commercially produced reciprocating motors.
- b] Electric motors, with the batteries carried in the model. Minimum 4.8 V

6.7.2 Definition of an Official Flight

An official flight shall be recorded when the model has been airborne for 15 seconds.

6.7.3 Number of Flights

Each competitor shall have the opportunity to make a minimum of four flights.

6.7.4 Flying Time

A minimum period of 15 minutes shall be allocated for trimming before the competition begins, and the competitor must be called 5 minutes before he/she is required to occupy the starting area. Failure to comply will result in loss of the flight.

The model will be released upon instruction from the flight judges within a period of 3 minutes, plus 1 minute for each additional motor. Only one release is permitted during the allocated time.

6.7.5 Judging for Flight Realism

5.1	Take-off.....	K = 10
5.2	Initial climb	K = 8
5.3	Descent and landing approach	K = 12
5.4	Quality of landing	K = 11
5.5	Realism in flight.....	<u>K = 24</u>
	Total.....	K = 65

6.7.6 Complexity Bonus

The flight shall be subject to a complexity bonus as listed in the following schedule. All bonuses are additive. The best flight score shall be factored by the appropriate total bonus to become the scoring flight.

Propellers (on different thrust lines)	% bonus
Single	0
Two or more	15

Note that each propeller must contribute significantly to the total thrust.

Undercarriage	% bonus
Fixed (any configuration)	0
Retractable (remains up for landing)	10
Retractable (lowers again for landing)	20

6.7.7 Marking (Flight Points)

Each part of the flight, as defined in 6.7.5 will be awarded marks between 0 and 10 by each judge during the flight. These marks are then each multiplied by the appropriate K factor and aggregated before the bonuses are applied as described in 6.7.6.

6.7.8 Flight Score

The flight score shall be the aggregate sum of points awarded by the judges as described in 6.7.6 and 6.7.7.

6.7.9 Total Score

Add the points earned in 6.1.12 to the best flight score as defined in 6.7.8.

**6.8 FREE FLIGHT SCALE MODELS
POWERED BY CO₂, JETEX OR ELECTRIC MOTORS**

General rules and standards for static judging apply as under 6.1 with the following amendment.

Minimum judging distances to read 1.5m and 0.5m instead of 3m and 1m (Note: 6.1.6a shall also apply).

6.8.1 General Characteristics

Maximum flying weight: 150gm

Maximum wing loading: 15gm/dm²

Motive power:

- a] Commercially produced reciprocating motors driven by carbon dioxide gas with the gas storage tank carried on the model, or compressed air.
- b] Electric motors with the batteries carried in the model. Maximum of 3 cells allowed 3.6 V. Maximum capacity 110 milliampere-hour.
- c] Solid Fuel Rocket Motor (Jetex)

6.8.2 Definition of an Official Flight

An official flight shall be recorded when the model has been airborne for 15 seconds.

6.8.3 Number of Flights

Each competitor shall have the opportunity to make a minimum of four flights.

6.8.4 Flying Time

A minimum period of 15 minutes shall be allocated for trimming before the competition begins, and the competitor must be called 5 minutes before he/she is required to occupy the starting area. Failure to comply will result in loss of the flight. The model will be released upon instruction from the flight judges within a period of 3 minutes, plus 1 minute for each additional motor. Only one release is permitted during the allocated time.

6.8.5 Judging for Flight Realism

5.1	Take-off	K = 10
5.2	Initial climb.....	K = 8
5.3	Descent and landing approach.....	K = 12
5.4	Quality of landing.....	K = 11
5.5	Realism in flight.....	<u>K = 24</u>
	Total.....	K = 65

6.8.6 Complexity Bonus

The flight shall be subject to a complexity bonus as listed in the following schedule. All bonuses are additive. The best flight score shall be factored by the appropriate total bonus to become the scoring flight.

Propellers (on different thrust lines)	% bonus
Single	0
Two or more	15

Note that each propeller must contribute significantly to the total thrust.

Undercarriage	% bonus
Fixed (any configuration)	0
Retractable (remains up for landing)	10
Retractable (lowers again for landing)	20

6.8.7 Marking (Flight Points)

Each part of the flight, as defined in 6.8.5 will be awarded marks between 0 and 10 by each judge during the flight. These marks are then each multiplied by the appropriate K factor and aggregated before the bonuses are applied as described in 6.8.6.

6.8.8 Flight Score

The flight score shall be the aggregate sum of points awarded by the judges as described in 6.8.6 and 6.8.7.

6.8.9 Total Score

Add the points earned in 6.1.12 to the best flight score as defined in 6.8.8.

ANNEX A

JUDGES GUIDE FOR STATIC JUDGING

General:

Prior to commencement, the judges should review the whole entry at a distance not closer than 3 metres in order that a standard be established for grading of points to be awarded. The entries should be studied in relationship to each other from a superficial aspect before detailed examination commences.

The evaluation is broken down into six items. Judges should discuss each item as a team and attempt to arrive at a unanimously agreed score for each item, although each judge will retain the right to differ. Any degree of difference should be marginal.

A chief judge shall be appointed as a spokesman. He should discuss the merits and criticisms of each item with the other judges, making suggestions for the scores to be awarded as a basis for further discussion. The use of fractions of a point (see 6.1.5) is important when judging top class models. There may be instances where, for example, a 9 would be too low and a 10 too high, and a suitable score might be, say, 9.5.

If models are flown before being static judged (see 6.1.3), any damage sustained during flight shall be ignored by the static judges.

Documentation for Proof of Scale:

The minimum documentation required must be provided. Failure to comply shall result in zero marks being awarded under 6.1.10 for items 1,2,3, 4 and 6.

Additional documentation is desirable, but a competitor should not be unduly penalised for lack of detail photographic authentication for an aircraft which no longer exists and for which it is impossible to obtain exhaustive authentication, provided that a fully detailed three-view drawing is presented.

Judging:

Items 6.1.10 to 3 must be judged at a minimum distance of 3 metres, from the nearest part of the model, and a handler who is not the competitor should be present to position the model as directed by the judges. items 6.1.10 to 6 must be judged at a minimum distance of 1 metre from the nearest part of the model. No measurements are to be taken and the models will not be handled by the judges.

Scale Accuracy:

Firstly, have the model positioned in a pose similar to that in the best photograph and check for any obvious discrepancies, also assess the "character" and realism of the model. Repeat this procedure with other suitable photographs. Then, using photographs and drawing, check:

- a] The side view, including the fuselage outline, cabin or canopy shape, cockpit aperture shape, engine cowling and spinner shape, outline of fin and rudder, wing and tail plane sections, wing stagger and struts on biplanes; shape, angle and position of landing gear legs and tail wheel or skid, size of wheels and tyres.
- b] End views, for dihedral, wing thickness and taper, wing struts, bracing and gap on biplanes, thickness of fin, rudder and tailplane, cross-sections of fuselage and engine cowling, cowling shape and cutouts, dummy propeller size and shape, shape of cockpit canopy or windshields; size, shape, position and angle of landing gear, wheel track, tyre thickness.
- c] Plan views (above and below) for wing outline and fairings, aileron size, flaps; tailplane size and outline; elevator size, shape and cut outs, trim tabs, fuselage shape and taper, cockpit or canopy shape, engine cowling shape.

Note: The photographs must take precedence over the drawings if there is any doubt concerning any item of scale accuracy.

Colour:

Correct colour may be established from colour photographs, from accepted published descriptions, from samples of original paint, or from accepted published colour drawings. Also check colours of national markings, lettering and insignia. Camouflage colour schemes should show the correct degree of merging of the shades.

Consideration should be given to the greater effort involved in reproducing multi-coloured finishes or the more difficult shades to simulate polished metal etc., compared to models which feature only one or two basic colours. Marks awarded should reflect the degree of complexity of the colour.

Markings:

Check the position and size of all markings and lettering. Check that the style and thickness of all letters and figures are correct. Check that any trim strips are of the correct dimensions and are correctly positioned. Check camouflage patterns.

The marks awarded should take into account both the accuracy and the complexity of the markings on the prototype.

Surface Texture and Realism:

The texture and appearance of the surface of the model should be a good reproduction of that of the prototype. Fabric covered types should be covered in the correct materials, and the outline of stringers and wingribs should be visible. Ply-covered or wooden monocoque types should be correctly simulated and any sag between the ribs and formers should be apparent if this is present on the prototype.

Metal stressed skin types should show simulation of panels and rivets.

In all instances, the appropriate gloss, eggshell or mat finish should be correctly reproduced.

Craftsmanship:

Model should be checked for quality of workmanship, with particular reference to filling of grain; clean, sharp edges, especially trailing edges of wings and tail surfaces; correct gaps at hinge line of control surfaces; close fit where wings are attached to fuselage, and general finesse. Check for any components which have not been made by the competitor (see 6.1.9.4d) and adjust the mark awarded accordingly. A complex subject should be awarded slightly higher marks than a simple subject.

Scale Detail:

Check that items such as those listed below are present on the model where applicable, and that they are accurately reproduced and correctly positioned.

Hatches	Brake pipes
Handles	Landing gear springing
Footsteps	Tyre treads
Doors	Wing slots
Armament	Navigation and landing lights
Bombracks	Pilot head
Control cables	Walkways
Control horns	Tanks
Fairings	Radiators
Bracing	Filler caps
Turnbuckles	Louvres
Struts	Cooling gills
Lacing or stitching	Mass balances
Aerials	Instrument panel
Venturis	Cockpit or cabin interior detail

The marks awarded should reflect both the accuracy and the quantity of the scale detail present. A well-documented highly detailed model should score proportionately higher than a model with little detail, even though the full-size prototype of the latter is similarly sparsely detailed.

Note: Upon the completion of the static judging of each model, the chief judge must check all score cards for completeness before passing them to the calculators. The panel of judges must examine the results of the calculations prior to publication. The panel of judges has the right to correct scores which are obviously wrong (e.g. deviations, details not proven by documentation, over looked items which were purchased). Only after this procedure has been followed should the scores be made available for publication, having been signed by the chief judge.

ANNEX B

NZMAA JUDGES GUIDE FOR SCALE FREE FLIGHT FLYING SCHEDULE

Applicable to sections:

- 6.3 Indoor F/F Rubber Scale
- 6.4 Outdoor F/F Scale Rubber
- 6.5 Indoor F/F CO2/Electric Scale
- 6.7 Outdoor F/F Power Scale
- 6.8 Outdoor F/F CO2/Electric/Jetex Scale

General:

Models should at all times fly in the same manner as the prototype. The following notes describe an average aeroplane; judges should use their own personal judgement to decide on an appropriate flight style for the prototype submitted and mark the flight accordingly. Competitors may submit a description of the prototypes flight characteristics (originated by a competent authority), which should be used to judge the flight.

Take-off:

The model should slowly accelerate from rest, leaving the ground after an appropriate ground run. The take-off run should be straight, and the transition to flight should be smooth.

Errors

The take-off should be penalised if: the ground run is too short, too long or assisted, the nose or tail wheel does not leave the ground before the main wheels, the wing drops or the run is curved. Note that a swing may occur as the tailwheel leaves the ground; this is normal and should not be penalised unless it is excessive.

Initial Climb:

The model should smoothly rotate to a climbing attitude, and commence a gentle straight or curved climb. The climb should be smooth and appropriate to the prototype.

Errors

The climb should be penalised if: too steep, too shallow, too highly banked, wing drop or wing rock occurs or nose attitude is too high or too low. Note that a high bank steep spiral climb is normal for a Pitts but that a Bleriot should hardly leave ground effect.

Realism in Flight:

The model should mirror the flight characteristics of the prototype in speed, flight attitude, stability and balance. The model may fly in a straight line or turn in either or both directions. Turns should display an appropriate amount of bank. The flight should be smooth and continuous, especially in the transitions between, take-off, climb, cruise, descent and landing approach. Due allowance must be made for the prevailing wind conditions.

Errors

Realism in flight should be penalised if: the model flies too slowly or too fast, the nose attitude is too high or too low, the model stalls, or shows fugoïdal flight path, has persistent wing drop or wing rock, flies an out of balance turn or pitches harshly on engine failure. A stall or wing drop may occur if the model hits turbulence or its own slipstream. If the recovery to stable flight is smooth, this should not be penalised. A grossly out of balance turn, left turn with right bank for instance, or a flat turn should be penalised.

Transition to descent:

The model's flight path should smoothly change between cruise and descent. The change may be abrupt, after an engine failure, or prolonged as the power slowly reduces. The direction of flight may or may not change.

Errors

The transition should be penalised if: the model stalls as the engine fails, wing drop or wing rock occurs or an excessive pitch change is apparent.

Descent and Landing Approach:

The descent should be smooth, continuous and stable. It may be straight or curved. The angle of descent should be consistent with that of the prototype, either engine on or engine off. Allowance must be made for prevailing wind conditions.

Errors

The descent and landing approach should be penalised if: the model stalls, drops or rocks the wings, shows too steep a glide or does not change to a landing attitude. Note that the glide angle may change significantly with engine on or engine off.

Quality of Landing (Indoor Only):

After adopting the landing attitude, the model should descend slowly to the floor, and touch down without bouncing. The ground run should be smooth and straight, with the model coming slowly to rest. Touch down may be on main wheels only, or on tail down three points.

Errors

The landing should be penalised if: the model bounces, the ground run is curved, the model does not stop, it ground loops or touches down too hard. Landings in a nose down attitude, or on the nose wheel, should be penalised.