FAI Sporting Code

Section 4 – Aeromodelling

Volume F4
Flying Scale Model Aircraft

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F4B - CONTROL LINE SCALE AEROPLANES
F4C - RADIO CONTROL SCALE AEROPLANES
F4H - RADIO CONTROL STAND-OFF SCALE AEROPLANES
ANNEX 6A - JUDGES' GUIDE – STATIC
ANNEX 6B - JUDGES' GUIDE – CONTROL LINE FLIGHT
ANNEX 6C - JUDGES' GUIDE – RADIO CONTROL FLIGHT
ANNEX 6D - JUDGES' GUIDE – FREE FLIGHT
ANNEX 6E - FORMS
ANNEX 6F - JUDGES' GUIDE – STAND-OFF SCALE
ANNEX 6G - JUDGES' GUIDE – RC FLYING SCALE MODEL HELICOPTERS
F4A - FREE FLIGHT OUTDOOR SCALE AEROPLANES (Provisional)
F4D - FREE FLIGHT INDOOR RUBBER SCALE AEROPLANES (Provisional)
F4E - FREE FLIGHT INDOOR CO_2 OR ELECTRIC SCALE AEROPLANES (Provisional)
F4F - FREE FLIGHT PEANUT SCALE AEROPLANES (Provisional)
F4G - RADIO CONTROL LARGE SCALE AEROPLANES (Provisional)
F4J - RADIO CONTROL TEAM SCALE AEROPLANES (Provisional)
F4K - RADIO CONTROL SCALE HELICOPTERS (Provisional)

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PART SIX - TECHNICAL RULES FOR FLYING SCALE AIRCRAFT CONTESTS

6.1 GENERAL RULES AND STANDARDS FOR STATIC JUDGING OF SCALE MODEL AIRCRAFT

6.1.1. Definition of Scale Model Aircraft:

A scale model aircraft shall be a reproduction of a heavier than air, man-carrying aircraft. The classes F/A/B/C/D/E/F/G/H/J/ are fixed-wing classes; the class F4K is a motorised rotary wing class. The aim of scale contests is to recreate the accurate appearance and realism of the full-size aircraft as best appropriate to each model aircraft class. This shall apply equally to static judging and flight performance.

Note: To indicate the subject full-size aircraft being scale modelled, the word "prototype" may be 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 Flying Scale Model aircraft
6.3. Radio Controlled Flying Scale Model aircraft

6.1.3. Competition Programme:

A competition programme for a particular event shall consist of part 6.1 plus the regulations for the specific event. Rules for the C/L events shall consist of 6.1. plus 6.2. and for the R/C events, shall be 6.1. plus 6.3.

The C/L event will commence with static judging, flying will start upon completion of this.

The R/C event will commence with flying on the first day of competition, with static judging commencing after the first model aircraft has been flown. Thereafter flying and static judging will be carried out concurrently, model aircraft being flown before being presented for static judging. No competitor will be required to fly more than one flight before being static judged.

If there are more than 45 competitors by the official closing date for entries in a World or Continental Championship, the organiser may use two separate panels for static judging. Each panel shall consist of two judges. The first panel will judge Scale Accuracy (6.1.10.1 – Side View, End View and Plan View). On completion of this, the second panel will judge the remaining aspects (6.1.10.2. – 6.). Under these circumstances the R/C event will commence with static judging. Flight judging will commence once the first 10 models have been statically assessed. In this case all competitors shall have their static judging done before the first flight.

6.1.4. Judges

The organiser of Scale R/C World or Continental Championship (F4C) shall appoint three (or four for two panels) judges to do static judging, plus a separate panel of three judges to judge the flying. If there are more than 45 competitors at a World Championship, then the organisers may use two static panels of two judges each as well as two flight lines with three judges on each flight line.

For Championships with less than 45 competitors in a class, the organiser is allowed to use two sets of two static judges instead of one set of three judges to speed up static judging.

Within each class (F4C and F4H) all the judges (static and flying) must be of a different nationality and selected from a list submitted by the NACs for guidance and approved by the CIAM Bureau.

In the case of World and Continental Championships, the flight and static judges' panels shall contain at least one member of the Scale CIAM Sub-committee. The CIAM Bureau must approve the two panels of judges prior to the World or Continental Championships.

Within each panel of Judges (Static and Flying), there must be a common language. The organiser is allowed to use two judges of the same nationality, one in each class, F4C and F4H.

For World Championships the Panel of Judges should be composed of judges from at least three continents.

6.1.5. Scoring

Where a K-factor (K) is noted, marks shall be awarded from 0 to 10 inclusive using increments of half a mark for Flight Judging and a tenth of a mark for Static Judging. The score shall then be calculated by multiplying the marks awarded by the K-factor (K).

6.1.6. Remarks

a) All model aircraft shall become airborne in the manner of their prototype.

b) In the absence of suitable water surface conditions, model aircraft of seaplanes are permitted to use wheels or wheeled dollies for take-off. The release or dropping of a dolly immediately after take-off will not therefore be penalised. Deviation from Scale because of the inclusion of permanently attached wheels, skids or similar non-prototype devices in the model aircraft structures will not be taken into consideration in the scoring of Fidelity to Scale and Craftsmanship.

c) No parts of a model aircraft, except propeller and spinner may be removed, nor may anything except a dummy pilot and antenna be added externally to the model aircraft, between scale judging and flying. Bombs, drop-tanks, etc must be presented for static judging, but may be replaced before flying by simpler and repairable examples of the same shape, colour, size and weight. Any infringement will result in disqualification. Additional non-prototype air inlets entries are permitted provided they are covered by movable hatches for static judging; these hatches may be moved or opened manually prior to flight, or if in flight by means of radio control. Necessary repairs due to flight damage are permitted, but the maximum weight limit still applies. The appearance of the model aircraft in flight must not be unduly affected.

d) A flying propeller of any form or diameter may be substituted for a scale propeller. The size, shape and colour of the spinner may not be changed.

Note: Substitution for a scale propeller relates only to powered propellers that were intended to propel the subject aircraft. If a model aircraft of a multi-engined aircraft uses non-powered (windmilling) propellers, these may not be changed between static and flying. Features such as for example, the small generator propeller on the nose of an aircraft such as a Me163, may likewise not be changed for flying propellers

e) Metal bladed flying propellers are forbidden.

f) Explosives must not be dropped.

g) 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 must be equally visible during flight in the model aircraft. If such a pilot is not fitted, the total flight score shall be reduced by 10%. The dummy pilot may be present during static judging but will not be taken into account.

h) A measurement of weight must be undertaken immediately after the first flight of each Model aircraft. No modification of the model aircraft except exhausting of fuel and cleaning of the model aircraft is allowed. If found to be overweight, then zero points will be awarded for that flight and the model aircraft must be re-weighed after each subsequent flight. The officials responsible for weighing the model aircraft and the device to be used shall be available to all competitors for weighing prior to the first flight of the contest. The tolerance of the weighting equipment to be added to the maximum weight (i.e. C/L model aircraft max weight 6 kg, weight tolerance 15 grams gives total allowed weight of 6.015 Kg as maximum).

i) Any model aircraft that, in the opinion of the Chief Judge or the Flight Line Director, appears to be noisy in flight will have to submit to a noise check after that flight. Turbine powered model aircraft are exempt from such noise checks. For details see sections 6.2.1 (F4B) and 6.3.2 (F4C). The organiser must provide all competitors with the possibility to conduct noise checks prior to the competition if competitors so request.

j) The contest should be interrupted or the start delayed by the contest director in the event that the wind is continuously stronger than 9 m/s measured at two (2) metres above the ground at the flight line, for at least one minute.

6.1.7. Number of Model Aircraft

Each competitor may compete only with one model aircraft in any one category, Control Line or Radio Control.

6.1.8. Helpers

Each competitor is permitted one (1) helper during a flight. An additional helper may assist with engine starting and pre-flight preparation, should the competitor require this. All but one helper must retire clear of the flying area before the take-off is announced. For radio control events no helper may touch the transmitter during an official flight.

The timekeeper is responsible for watching that helpers do not touch the transmitter once the first manoeuvre has been called. If a helper touches the transmitter the flight is scored zero.

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6.1.9. Documentation (Proof of Scale)

6.1.9.1. Proof of scale is the responsibility of the competitor.

6.1.9.2. The exact name and model designation of the prototype shall be indicated on the entry form, on the score sheet, and also in the "Proof of Scale" presentation. The documentation submitted by the competitor must state if the original prototype is non-aerobatic. The judges will discuss this information before the first flight commences in F4C. The Chief Judge shall make the final decision before any flight is made and this might affect the marks awarded under 6.3.6.11.d. (Choice of options).

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

6.1.9.4. To be eligible for Fidelity to Scale (Static) points the following is the minimum documentation that must be submitted to the judges
(See Annex A - 6A.1.9. for recommended presentation of documentation):

a) Photographic evidence:

At least three photographs or printed reproductions of the prototype, including at least one of the actual subject aircraft being modelled are required. Each of these photographs or printed reproductions must show the complete aircraft, preferably from different aspects and must not be smaller than A5. These main photos must be submitted in triplicate, the second and third copies may be photocopies. Photographs of the model are not permitted unless the model is posed alongside the full size prototype and the photo used as proof of colour. The use of photographs based on digital files which show evidence of being enhanced or manipulated shall result in disqualification. The photographic evidence is the prime means of judging scale accuracy against the prototype.

b) Scale Drawings:

Accurate scale drawing of the full-size aircraft that show at least the 3 main aspects of Side View, Upper Plan View and Front End View. These drawings must be to a common scale giving a minimum span of 250 mm, and a maximum span of 500 mm or if the fuselage is longer than the wingspan, these measurements will be made on the fuselage. The drawings must be submitted in triplicate. Unpublished 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, the builder of the original aircraft, or other competent authority.

c) Proof of Colour:

Correct colour may be established from colour photographs, from published descriptions if accompanied by colour chips certified by a competent authority, from samples of original paint, or from published colour drawings, eg "Profile" type publications.

d) Aircraft speed:

The cruising speed of the subject aircraft must also be included in the documentation, and repeated on all flight score sheets before each official flight starts. In the case of early aircraft, where only maximum speeds are likely to be listed, the maximum speed alone may be quoted in the documentation. The competitor must be prepared to substantiate this information if required.

e) Competitor's declaration:

The competitor must include in his documentation a signed declaration that his model conforms to the requirements and rules appropriate to the class of model. The Competitor's Declaration also contains a questionnaire which is used by the Judges to determine the origin of the model design and its construction and the extent of use of commercially available components.
The declaration form is at ANNEX 6E.1

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6.1.10. Judging for Fidelity to Scale and Craftsmanship

K - Factor

1.	Scale Accuracy	
	a. Side view	13
	b. End view	13
	c. Plan view	13
2.	Colour	
	a. Accuracy	3
	b. Complexity	2
3.	Markings	
	a. Accuracy	8
	b. Complexity	3
4.	Surface texture and scale realism	
	a. Surface Texture	7
	b. Scale Realism	7
5.	Craftsmanship	
	a. Quality	12
	b. Complexity	5
6.	Scale detail	
	a. Accuracy	9
	b. Complexity	5
Total K Factor.....		K = 100

Items .1 to be judged at a minimum distance of 3m in F4B, and 5m in F4C, from the centre of the model aircraft. Judges must not touch the model aircraft.

6.1.11. Static Scoring

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

Normalisation:

The total of the competitors' static scores will be normalised to 1000 points as follows:

$$\text{Static Points}_x = S_x/S_w \times 1000$$

Where:

Static Points_x = Normalised Static Score for competitor *x*

S_x = Static Score for competitor *x*

S_w = Highest Static Score

6.1.12 Organisation of Scale Events

For transmitter and frequency control see Volume *General Rules* Section C, paragraph C.16.2

The flying and static order of the various countries and competitors will be established by means of a draw before the start of the contest. Team Managers shall nominate their individual team members' order as first, second or third.

The flight order of the competitors will not be changed unless, in the case of R/C events, the organisers need to do so to avoid frequency clashes. Sufficient flexibility in frequency sequencing must be provided to allow a competitor to make use of his transmitter, at the latest, by the time he enters the N° 1 ready box. There shall be no substitution of one team member's slot for another team member's slot.

The second flight round will start one-third the way down the flying order. The final round will be flown in ascending order with regard to the preliminary placing after two flight rounds and static.

Competitors must be called at least seven minutes for F4B and five minutes for F4C before they are required to occupy the starting area (see 6.2.4 flying time F4B).

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6.1.13 Builder of the Model

Scale models must be constructed and finished solely by the competitor. The only exceptions to this rule are for models entered in Class F4H and for team entries entered in Class F4J.

Note: The use of the word “constructed” in this context means that the competitor is the person who has done all the work on the model.

The Competitor must also prepare the model for flight, although helpers are permitted (see paragraph 6.1.8).

Commercially available components, machined parts, die or laser cut parts and prefabricated or moulded airframe components which are manufactured by a third party, whether specifically for the model or supplied as part of a kit, may be used in the construction of scale models.

Details of these items (excluding fixings, i.e. screws, nuts a bolts etc) must however, be entered on the Competitors Declaration Form and if they affect the visible scale accuracy or craftsmanship of the model they will result in a reduction of the marks awarded during static judging.

If any commercially available parts have been modified by the competitor to improve scale accuracy then the evidence of this work must be supplied (attached to the declaration) in order for the Judges to assess the craftsmanship.

If found in violation of this rule the competitor may be disqualified from the contest.

Copies of the Declaration Forms of all contestants shall be made available for examination by all contestants. If a contestant or number of contestants disagree with what has been claimed by a contestant, he/they may lodge an official protest by the normal procedure together with clear proof of their claim within twenty four hours of the publication of the forms. The protest is then handled by the jury as per normal procedure and they decide on the validity of the protest and a suitable sanction.

6.1.14 Demonstration of Functional Scale Detail during Static Judging

The model should be presented for static judging supported only by its undercarriage or normal aids to take-off and landing. If applicable, folding wings may then be unfolded and locked for flight in the manner of the full size aircraft. With the exception of undercarriage retraction, a demonstration of functional detail of any part of the model is permitted providing such functionality is normally only operable by the pilot or aircrew of the full size aircraft, from their crew position.

6.6 CLASS F4D - FREE FLIGHT INDOOR RUBBER SCALE AEROPLANES (PROVISIONAL)

6.6.1. General Rules and Standards for Static Judging

As 6.1. with the following exception:

a) 6.1.10. Minimum judging distances to read 1,5 m and 0,5 m.
Note: 6.1.6a shall also apply.

6.6.2. General Characteristics

Maximum flying weight: ..... 150 g

Maximum wing loading: ..... 15 g/dm^2

Motive power: Extensible motor(s) only

6.6.3. Definition of an Official Flight

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

6.6.4. Number of Flights

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

6.6.5. 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 she/he is required to occupy the starting area. Failure to comply will result in loss of the flight. The model aircraft 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.

6.6.6. Judging for Flight Realism

6.6.6.1. Take-off (optional, see Section 4c, 6.1.6a)..... K = 10
6.6.6.2. Initial climb..... K = 8
6.6.6.3. Descent and landing approach..... K = 12
6.6.6.4. . Quality of landing. ..... K = 11
6.6.6.5. Realism of flight. ..... K = 24
Total K Factor.. ..... K = 65

6. 6.7. 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.

a) Motors (on different thrust lines)	bonus
Single	0
Twin	10%
Three	10%
Four	20%

Note: To qualify for the multi-engine bonus, each propeller must be driven by a separate engine unless this was not the case with the prototype modelled. The engines must deliver similar levels of power.

b) Landing gear	bonus
Fixed (any configuration).....	0
Retractable (remains up for landing).....	10%
Retractable (lowers again for landing)...	20%

6.6.8. Marking (Flight Points)

Each part of the flight, as defined in 6.6.6. 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 6.6.7.

6.6.9. Flight Score

The flight score shall be the aggregate sum of points awarded by the judges as described in 6.6.6. and 6.6.7.

6.6.10. Total Score

Add the points earned in 6.1.11. to the best flight score as defined in 6.6.9.