Section 4 – Aeromodelling
Volume F2
Control Line Model Aircraft

2027 Edition

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Revision history - List of changes and amendments

This 2027 edition includes the following Amendments made to the 2025&2026 code
These amendments are marked by a double line in the right margin of this edition

Paragraph	Plenary meeting approving change	Brief description of change	Incorporated by
Complete volume	Decision of FAI Board	All headers, paragraphs and sections were renumbered to keep the FAI's template and design	Pavol Barbaric – F2 SC Chairman
F2G			
	2024	4.5 Class F2G added as new 1-st Level Events Class	06/2024,
	2025	4.5.2 a) Added new definition of power source maximum no load Voltage	
	2025	4.5.2 b) Added new definition of maximum cells amount	
F2B			
4.2.7 g) i	2022	Correction to number of minutes.	Tyson Dodd Ciam Technical Secretary Revised by Vernon Hunt F2 S-C Chairman 06-02-23
F2C			
4.3.3.2 i)	2020	Delete retractable landing gear.	
4.3.5 b)	2022	Comprehensively amended the paragraph.	
F2D			
4.4.15 h)	2022	Additional text regarding fly-offs.	
Annexes			
Annex 4A	2024	Annex description – F2G added	Pavol Barbaric, F2 SC Chairman, 05/06/2024
Annex 4D		Annex 4D F2D Judge's guide:	F2G Working Group / Pavol Barbaric, F2 SC Chairman, 05/06/2024
		4.4.3 using WHITE paint/calk to mark the circles	
		Specification of stepping-in and stepping-out the pilot and flying circles	
		Changed graphics in 4.4.13. A), b) - Circle definition	
		Added graphical and text illustration for "step-in" and "step-out"	
Annex 4E		4.E.2. Junior's age in F2 Team race juniors - Clarification	CIAM Bureau
Annex 4F		APPENDIX II - Aerobatics Circle Dimensions	F2B Working Group by Peter German
Annex 4K		Deleted whole Annex due to promoting the F2G rules as part 4.5	
Annex 4C	2022	4.C.6.5 the whole text deleted as a consequence of the amendment to rule 4.3.5. b).	Tyson Dodd, CIAM T. Secretary

Four-Year Rolling Amendments for Reference			
Paragraph	**Plenary meeting approving change**	**Brief description of change**	**Incorporated by**
Annex 4D	2022	Rule 4.4.13 C. t) Additional text regarding picking up an opponent's model.	
Annex 4B		4.B.14 Four-leaf clover manoeuvre updated.	
Annex 4B		4.K.2 d) Deleted total projected area; added maximum weight.	
F2A			Kevin Dodd Technical Secretary & Vernon Hunt F2 S-C Chairman
4.1.7	2020	Added that Team Managers may request time sheets.	
F2B			
4.2.2	2020	Deleted paragraph e) regarding external shutdown device.	
4.2.6		Replaced entire Noise Testing procedure.	
4.2.11		Amended the limit for the daily working time of judges.	
4.2.15.4, 4.2.15.8, 4.2.15.9, 4.2.15.10, 4.2.15.12, 4.2.15.14		Amended the note to redefine turns in the manoeuvre.	
4.2.15.16		Replaced entire description of this manoeuvre.	
F2C			

Four-Year Rolling Amendments for Reference			
Paragraph	**Plenary meeting approving change**	**Brief description of change**	**Incorporated by**
4.3.3 e)	2020	Defined silencer measurements.	
4.3.3.2 i)		Removed the option of a retractable undercarriage with an implementation date of **1/1/2023**. This rule will be placed in a new **Annex O**.	
4.3.3.2 h)			
F2D & Annex 4D			
Numbering	n/a	Corrected the numbering and references, resulting from the inclusion of par. 4.4.5 in 2019; however, the consequential numbering changes were overlooked.	

FAI Authority

The competition will be conducted under the authority granted by the FAI, according to the regulations of the Sporting Code of the FAI, General Section, and Section 4 as approved by the CIAM and validated by the FAI, and these rules. All participants accept these rules and the FAI regulations as binding by registering in the competition.

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RULE FREEZE FOR THIS VOLUME

With reference to paragraph A.10.2 of CIAM General Rules:

In all classes, the two-year rule for no changes to model aircraft/space model specifications, manoeuvre schedules and competition rules will be strictly enforced. For Championship classes, changes may be proposed in the year of the World Championship of each category.

For official classes without Championship status, the two-year cycle begins in the year that the Plenary Meeting approved the official status of the class. For official classes, changes may be proposed in the second year of the two-year cycle.

This means that in Volume F2:

a) changes can next be agreed at the Technical Meeting of 2026 for application from 1st January 2027.
b) provisional classes are not subject to this restriction.
c) the F2B manoeuvre diagrams continue to be in a separate document called “Volume F2 Control Line Annex 4J”.

The only exceptions allowed to the two-year rule freeze are genuine and urgent safety matters, indispensable rule clarifications and noise rulings.

Note: It is the aspiration of the 2018 F2 subcommittee to have a ten-year moratorium on changes to the technical specifications of F2C models and equipment. Changes will only be made for safety reasons.

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VOLUME F2

SECTION FOUR – TECHNICAL REGULATIONS FOR CONTROL LINE CONTESTS

1.1. General rules

The contest organiser must provide a protective 2.5 m high wire enclosure at C/L speed and T/R contests to ensure the safety of spectators. For temporary circles, the height shall be at least 2.0 m high. The circuit surface shall be firm, smooth and free of grit or dust. The radius of all circles shall be clearly marked with a white line at least 25 mm wide. Provision of adequate practice areas shall be made before and during World and Continental Championships.

1.2. Interruption of the contest

Wind stronger than 9 m/s for at least 30 seconds (instead of 12 m/s for at least one minute in CIAM General Rules).

1.3. Safety Strap

In accordance with CIAM General Rules B.1.2.2.e), for all F2 classes a safety strap connecting the competitor's wrist to the control handle must be provided by the competitor and used during all flights A pull test shall be applied separately to the safety strap. This pull test will be applied according to each class specification concerning the lines' pull test.

CLASS F2A – Control Line SPEED

Note: The F2A Judges' Guide is at Annex 4A.

F2A.1 Definition of a Speed Model Aircraft

Model aircraft in which the power is provided by a piston motor and in which lift is obtained by aerodynamic forces acting on the supporting surfaces, which remain fixed in flight except for control surfaces.

F2A.2 Characteristics of a Speed Model Aircraft

Maximum swept volume of motor or motors	2.5 cm^3
Minimum total projected area	5.0 dm^2
Maximum total projected area	6.0 dm^2
Maximum loading	100 g/dm^2
Maximum wingspan	100 cm

To determine the wingspan of asymmetric model aircraft the thrust line of the model aircraft is used. Refer CIAM General Rules B.4.27

The model aircraft must take off from the ground.

A silencer is compulsory. Minimum internal volume 50 cm^3. Maximum tailpipe internal diameter 6 mm.

An effective shutoff is compulsory so that the duration of high-level noise can be limited to 20-30 seconds per flight.

F2A.3 Fuel

Fuel to a standard formula for glow plug and spark ignition motors will be supplied by the organisers. Its composition shall be 80% methanol, 20% first pressing castor oil. Fuel shall be mixed by volume.

Note: Fuel for compression ignition motors is not restricted.

Before each attempt for an official flight the fuel tank must be rinsed (washed out) with standard formula fuel.

F2A.4 Control Lines

a) Only two-line control is allowed, minimum control line diameter is 0.40 mm with a tolerance of minus 0.011 mm.

b) No intentional twisting and/or linking of the two lines together shall be permitted from the point of exit of the model aircraft to the control handle. The lines shall be separated by at least 5 mm at the point of exit from the model aircraft and at least 25 mm at the handle.

c) The lines must be round in cross-section and may not have any liquid or coating material applied. Solvent may be applied for cleaning only.

F2A.5 Length of Course and Flight Circle.

d) The measured distance covered by the model aircraft must be at least one kilometre. The radius of the flight circle must be 17,69 m. (9 laps = 1 km).

e) A pilot's circle 3 metres in radius and a safety circle 21 metres in radius shall be clearly marked

F2A.6 Line Tests (to be made before each attempt for an official flight)

The radius is measured from the axis of the pivot on the pylon, to the axis of the propeller. Where two propellers are employed, the axis of symmetry is taken as the reference for measurement.

A load sufficient only to remove the slack from the lines shall be applied during the line length check.

A load test shall be applied to the assembled control handle, lines, and model aircraft equal to 50 times the weight of the model aircraft and this test shall be applied separately to the safety strap.

In each case the pull shall be applied three (3) times, slowly increasing to maximum load and

releasing rapidly. The pull test should be made on the handle grip, not near the point of attachment of the lines (see sketch).

The diameter of the lines shall be checked at random distances on at least three points along the length of each line.

F2A.7 Control Handle and Pylon Fork

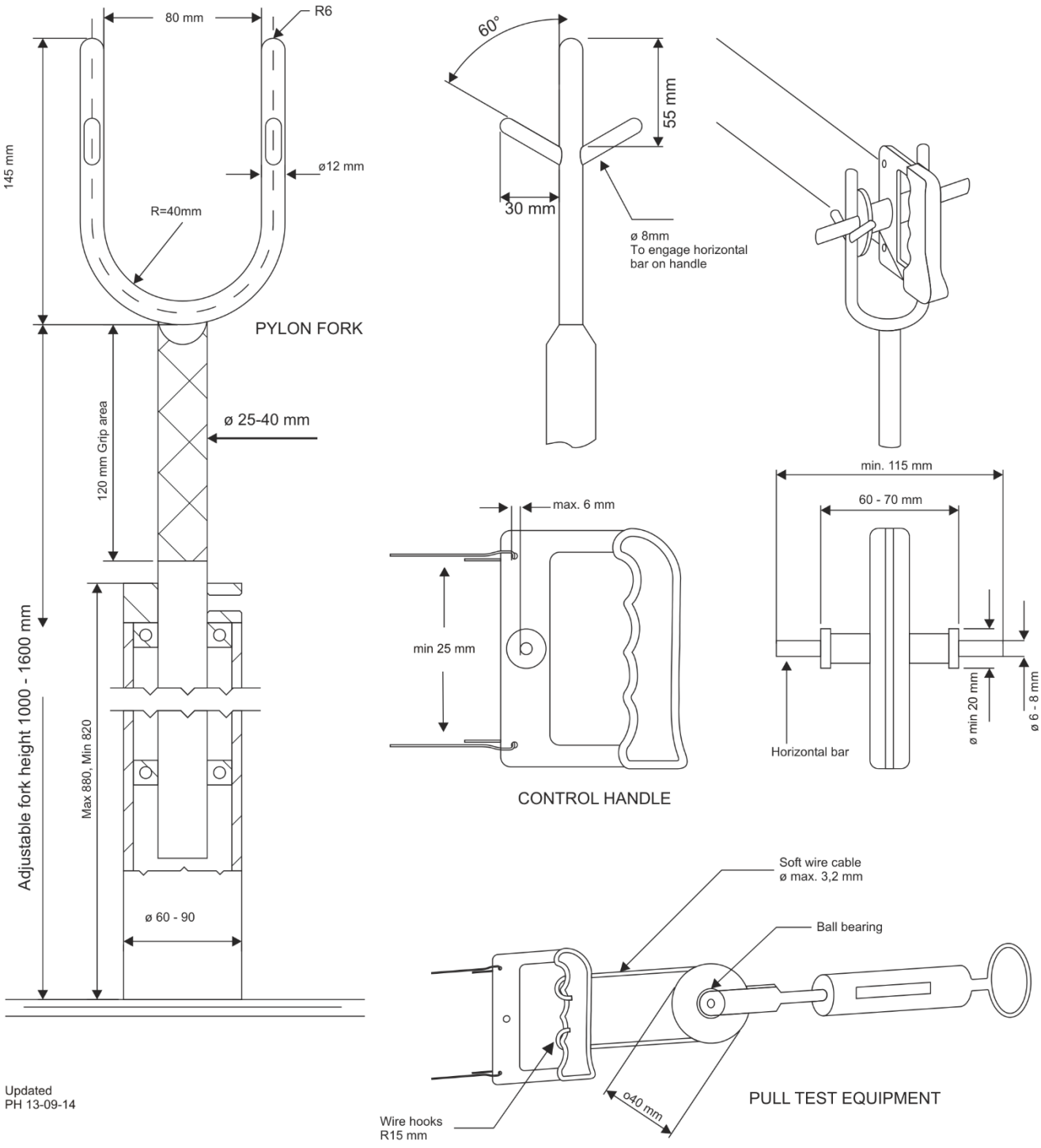
A pylon with supports, as shown in F2A Figure 1 will be placed at the disposal of the competitors by the organisers. It is compulsory that a pylon fork and control handle of standard dimensions as specified, be employed. The distance between the flexible point of attachment on the control handle and the point of contact of the horizontal bar on the fork shall be a maximum of 6 mm which is equal to half the diameter of the U-shaped bracket material. The horizontal bar (handle pivot) must be in continuous contact with the pylon fork during the official flights. (See the notes in the F2A Judges Guide.)

The pylon fork shall be infinitely adjustable between 1000 mm and 1600 mm from the ground and be steadily fixed to the ground surface. Mandatory dimensions are shown in the sketch. The pylon fork in its highest position may not deflect more than 20 mm when it is subjected to a horizontal pull test of 250 N.

A safety strap connecting the competitor's wrist to the control handle must be provided by the competitor and used during all flights.

Note: F2A Figure 1 appears overleaf.

F2A Figure 1



The handle dimensions are mandatory; the design of the handle is not.

F2A.8 Definition of an Attempt

It is considered an attempt when the pilot does not engage the control handle in the pylon fork within 3 minutes after the starting signal.

F2A.9 Number of Attempts

In the case of an unsuccessful first attempt for an official flight, the competitor is entitled to a second attempt.

F2A.10 Definition of an Official Flight

The flight is official when timing commences.

F2A.11 Number of Flights

Each competitor is entitled to a minimum of three and a maximum of four official flights. The number of rounds shall be specified before the start of the competition. For the draw procedure, refer to F2A Judges Guide at Annex 4A, rule 4.1.9 Draw for Flying Order.

F2A.12 Number of Helpers

a) A pilot may not receive telecommunicated information during an attempt/flight.

b) Two helpers may assist the pilot in the contest circle.

c) In the case of a complete national Speed team (3 or 4 members), the two helpers must be two of the other team members or one team member and the team manager.

d) In the case of an incomplete national Speed team, supporters or members of other incomplete national Speed teams may act as helpers provided that they are registered as such to no more than one national team for the duration of the contest.

e) In the case where there are two entrants in an incomplete team, the second team member must act as one of the helpers for the other entrant from his own country. In this case, the entrants from the incomplete team may employ only one registered entrant from another incomplete team or one registered supporter from any country or the entrant's team manager as their second helper.

f) In the case where there is a single entrant from a country the competitor may use two registered helpers. In this case the entrant from the incomplete team may employ up to two registered entrants from other incomplete teams or up to two registered supporters from any countries. Or the entrant's team manager and one other helper as specified above.

g) In any case, the team manager may also enter the contest circle.

h) The defending champion, flying as an individual, may choose any helpers he wishes.

Note 1: A maximum of four people may enter the circle, the pilot plus two helpers and the team manager; the fourth person may only act as an observer.

Note 2: All references to "team" mean "Speed Team"

F2A.13 Starting of Timing

The timing commences officially when the competitor has placed his handle in the pylon fork and the model aircraft having made 2 complete circuits again passes the electronic sensor or the height marker on the edge of the circuit directly opposite the timekeepers.

F2A.14 Height of Flight

During the timing of an official flight, the flying height must not be less than one metre and not more than 3 metres.

F2A.15 Cancellation of the Flight

A flight is cancelled when:

a) any physical effort for the purpose of increasing the speed of the model aircraft during an official flight is applied by the pilot.

b) if at any time during the speed course the model aircraft exceeds a height of 6 metres or sustains a height in excess of 3 metres or less than one metre for more than one lap.

c) continuous contact is not maintained with the pylon fork during the official flight.

d) jettisoning occurs during the official flight.

F2A.16 Number of Timekeepers and Judges

a) The time shall be taken by either three timing officials equipped with 1/100-second resolution digital stopwatches or by an optical electronic system with equal or better resolution or accuracy.

b) For World and Continental Championships: where timekeeping is electronic, two electronic systems must be used. One system shall be designated the primary system and the speeds from this system shall be used for classification purposes. The other system shall be designated the secondary system and shall be the required back-up system. Only in cases where there is a failure of the primary system may the speeds from the secondary back-up system be used for classification purposes. For other contests, the required backup for a single system may be by some other electronic device or by two manual timekeepers.

c) Speed judges, at least two in number, shall be responsible for observing the conduct of the pilot and the altitude of the flight.

d) For World and Continental Championships, a senior judge shall be appointed to supervise the conduct of the timekeepers and judges.

e) The senior judge shall be selected from a list of persons who are nominated by NACs for their proficiency and experience and approved by the CIAM.

F2A.17 Timing

a) The individual times recorded by each timing official and/or by an optical electronic system shall be recorded in writing and retained by the senior judge or other official.

Manual Timekeeping

i. The mean time of the three stopwatches shall be used to calculate the result.

ii. In the case where one stopwatch differs from the closer of the other two by more than 12/100 seconds, or the official reports that he made a mistake, then the meantime shall be calculated from the other two stopwatch times.

iii. In the case where two stopwatch times differ by 12/100 seconds from the middle one, or two officials report that they made mistakes then this must immediately be reported to the competitor or his team manager. The competitor then has the choice of using only the remaining stopwatch time to calculate his result or he may take a replacement attempt. His decision must be given to the F2A Circle Marshall without delay and is irrevocable.

iv. No rounding off decimals shall be made when calculating the mean time. The time

v. The speed in km/h shall be calculated by dividing 3600 by the time according to a) and then taken to the nearest lower 1/10 km/h

Electronic Timing with Manual Backup

i. The recorded speed in km/h shall be taken from the Electronic Official Speed (E Result) column for the TransiTrace system) of the electronic system for the result.

ii. The senior speed judge shall check the result by looking at the logged individual lap times of the official flight, as well as the laps before and after the official flight.

iii. In the case where the electronic system does not return a clear time and speed then the mean of the two backup stopwatches shall be used to calculate the result.

iv. In the case where the two backup stopwatches differ from each other by more than 12/100 seconds, then this must immediately be reported to the competitor or his team manager. The competitor then has the choice of using the slower stopwatch time to calculate his result or may take a replacement attempt. His decision must be given to the F2A Circle Marshall without delay and is irrevocable.

Electronic Timing with Electronic Backup (Primary & Secondary Systems)

i. The recorded speed in km/h is to be taken from the Electronic Official Speed (E Result) column for the TransiTrace system) of the primary system for the result.

ii. The senior speed judge shall check the result by looking at the logged individual lap times of the official flight, as well as the laps before and after the official flight.

iii. In the case where the primary system does not return a clear time and speed, then the recorded speed in km/h shall be taken from the Electronic Official Speed (E Result) column for the TransiTrace system) of the secondary system for the result.

iv. In the case where the primary and secondary systems both fail to return a clear time and speed, then the competitor shall be given a replacement attempt.

a) Replacement attempts shall be scheduled to take place within one hour of the original attempt.

b) Immediately after finishing the actual flight, the competitor or the team manager can ask for the complete time sheet (including the times of each lap) or after finishing the round (the flights that day), the team manager(s) on request, will be provided with complete time sheets (including the times of each lap).

F2A.18 Individual Classification

a) The best speed attained during the three or four flights is used for classification. In case of a tie, to separate the fliers, the second-best speed, and if still a tie, the third best speed is used.

b) The three first positions are subject to rechecking of the declared model aircraft characteristics.

F2A.19 Team Classification

To establish the national team scores for the team classification, add together the best speed attained by each individual member of the team. In a case of a team tie, the team with the lower sum of place numbers, given in order from the top, wins. If still equal, then the best individual placing decides.

CLASS F2B – CL AEROBATICS

F2B.1 Definition of an Aerobatic Model Aircraft

Powered control line aerobatic model aircraft as per CIAM General Rule B.1.2.2 which all aerodynamic surfaces remain fixed during flight (except for the propeller plus that/those surface/s used to control the flight path).

Characteristics of an Aerobatic Model Aircraft

a) Maximum total flying weight (excluding fuel) 3.5 kg
b) Maximum wingspan (overall) 2.0 m
c) Maximum length (overall) 2.0 m
d) Permitted power sources shall include any power except rocket motors. Piston engine/s shall be subject to a total swept volume limitation of 15 cm3. Electric power shall be limited to a maximum no-load voltage of 42 volts. Gas turbine engines shall be limited to 10 N static thrust.
e) A suitable silencer must be used on all piston engines.
f) The noise limit set out at paragraph 4.2.6 c) shall apply to all power sources.

Line Length

The minimum length of control lines shall be 15.0 meters, the maximum length 21.5 metres, to be measured from the centreline of the grip of the control handle to the centreline of the propeller. Where model aircraft with multiple power sources are used the longitudinal (fore and aft) centre line of the model aircraft shall be taken as the reference for measurement.

Line Tests (to be made before each contest flight)

a) The length of the control lines shall be checked before every contest flight.
b) Not less than 15 minutes and not more than 30 minutes before every contest flight a test load of 10 times the total weight of the model aircraft without fuel shall be evenly and smoothly applied to the assembled control handle, lines, and model aircraft. The load used in this test shall be applied once only to the control handle in such a way that the test load is equally distributed between both flight lines/cables during the whole pull test.
c) It will be considered an attempt if the competitor fails to make his model aircraft available for the pull test within the given time frame in paragraph 4.2.4.b.
d) If the control lines are disconnected from a competitor's model aircraft after the pull test has been performed but before making the respective contest flight, then that competitor's control lines, and model aircraft shall again pass the above lines length check and pull test before making the respective official flight.

Contest Weather

a) In the case of turbulence preventing the safe conduct of flight, the Head Judge must interrupt the contest until safe flying is again possible.
b) For safety reasons any competitor whose contest flight is in progress during local electrical storm activity (thunder and/or lightning) shall be offered a re-flight. No contest flight shall be started when an electrical storm appears to be imminent, and if such conditions do occur the F2B Contest Director and Head Judge shall agree a suitable delay to the contest timetable and shall inform all contestants and contest officials as soon as is practicable.

Noise Testing

a) If requested by the F2B Contest Director, or the Head Judge, or an FAI Jury member present at the contest site, the noise level of any competitor's model aircraft shall be officially measured. Such requests shall only be made during or immediately after an official flight and if, in the opinion of the official requesting the noise test, the model aircraft concerned seems to have a noise level higher than 96 dB(A) when measured at exactly 3 metres. All requests for an official noise test shall be made only to the F2B Contest Director who then shall arrange a noise test to be performed on the model aircraft in its unchanged flying condition. Measuring equipment used shall be calibrated and the limit must not be exceeded by more than 2 dB(A).

b) If the model airplane fails to pass the noise test, the scores received in the related official flight are nullified.
c) The pilot may ask for a second official noise test. If the noise is then found to be within limits the model airplane may be used for further official flights.
d) A model aircraft failing to pass the second official noise test will be banned from further flying at the contest.

Contest Flights

a) When a registered competitor makes a flight which is intended to record a score in the contest, it shall be referred to as a contest flight. A contest flight shall become an official flight at the moment the model aircraft begins the ground roll of the take-off manoeuvre. All official flights shall result in a score being recorded against the respective competitor's name, except in the case of a re-flight being awarded and accepted, as provided at paragraph h) below.
b) All contests shall be organised based on rounds; a round being defined as complete when all registered competitors have completed their official flight or have made two attempts. At contests which include a fly-off, all rounds flown before the fly-off shall be referred to as elimination rounds and all rounds flown after completion of the elimination rounds shall be referred to as fly-off rounds.
c) All rounds which cannot be completed within one day shall be continued on the next day of the contest and shall be flown on the same contest flight circle and with the same judging panel as scheduled for the beginning (previous day) of that round.
d) Every registered competitor is entitled to two attempts in each round to make an official flight. An attempt shall have occurred when:
   i) the competitor did not pass through the entrance to the contest flight circle within 3 minutes of being officially called to perform a contest flight.
   ii) or the competitor did not release the model aircraft for the take-off manoeuvre within 3 minutes of the start of official timing of the 7 minutes period.
   iii) or if the competitor himself declares an attempt before releasing the model aircraft for the take-off manoeuvre.
e) or if the competitor fails to make his model aircraft available for the pull test within the timeframe given.

In each of the above cases the judges shall all record an attempt by a mark on the score sheet of the respective competitor.

f) After making a first attempt the competitor may choose to remain in the contest flight circle, in which case he shall make his second attempt immediately.
g) Alternatively, the competitor may choose to leave the contest flight circle after his first attempt, in which case he shall then be officially called to make a second attempt at the same contest flight circle after 30 minutes have elapsed from leaving the contest flight circle after his first attempt. This 30-minute rule shall apply even if the competitor's first attempt occurred at or near the end of the respective round.
h) If, when making his second attempt for the respective round, any of the following occurs:
   a) the competitor did not pass through the entrance to the contest flight circle within 3 minutes of being officially called.
   b) or the competitor did not release the model aircraft for the take-off manoeuvre within 3 minutes of the start of official timing of the 7 minutes period.
   c) or the competitor himself declares an attempt before releasing the model aircraft for the take-off manoeuvre.
      a) Then the judges shall all record an attempt by a mark of 0 (zero) points on the score sheet of the respective competitor.
i) A re-flight shall be offered to a competitor if in the opinion of the Head Judge:
   i) wind conditions or an electrical storm (as specified at 4.2.5) occurs during a contest flight.
   ii) due solely to contest flight circle ground conditions, a competitor's propeller strikes the ground causing the motor/s to stop running, or to run in such a way that it would be dangerous to fly the sequence of manoeuvres.

iii) a safety-related incident which is outside the competitor's control occurs during an official flight, and if said incident has impaired the respective competitor's ability to fly the sequence of manoeuvres. For the purposes of illustration only, such a safety-related incident could be, but shall not be limited to an un-supervised child or animal wandering into the contest flight circle during an official flight.

In all of the above cases, the competitor shall not have the respective official flight marked as an attempt and shall not be scored 0 (zero) points. Instead, the judges shall retain the original score sheets, and the Head Judge shall, offer the competitor a re-flight. The marks awarded during the official flight in which the incident took place shall not be disclosed to the competitor. Therefore, all competitors accepting a re-flight do so on the understanding that the scores awarded during the official flight in which the incident took place shall be deleted and replaced by whatever scores are awarded during the re flight. If a re-flight is accepted, then this shall be performed as soon as possible after the competitor has accepted the re-flight, and on the same contest flight circle and with the same panel of judges as the official flight during which the incident took place.

Number of Rounds

a) Contests may be held either at sites with one contest flight circle available (hereafter a "Single Circle" format contest), or at sites with two contest flight circles available (hereafter a "Double-Circle" format contest).

b) At all Single-Circle format contests organisers shall schedule the contest so that all registered competitors fly a minimum of 3 rounds (3 elimination rounds at contests where a fly-off is to be included). At Double-Circle format contests organisers shall schedule the contest so that all registered competitors fly a minimum of 2 rounds per contest circle to be used (2 elimination rounds per contest circle to be used at contests where a fly-off is included).
Under exceptional circumstances, the FAI Jury may reduce the number of rounds.

c) Under exceptional circumstances, World or Continental Championships and other limited international contests will be organized on Double-Circle Format. In those conditions and regarding the number of competitors and the maximum limit of 50 contests flights to be scheduled for a judge on one day (see 4.2.11), the elimination rounds will be organised on two, three or four days.

d) At World and Continental Championships and other limited international contests, organisers shall also arrange an additional fly-off for the 15 competitors holding the best scores (plus any competitors with scores tying for the 15th place) after calculating placing at the end of the last elimination round. The fly-off shall consist of three separate fly-off rounds, all to be flown on the same contest flight circle.

e) When the number of participating junior competitors is sufficient to give a title of World or Continental Junior Champion, organisers shall also arrange an additional fly-off for the three juniors holding the best scores (plus any juniors with scores tying for the 3rd place) after calculating placing at the end of the last elimination round. If any junior is in the overall top 15 and already flying in the fly-off, his/her open and junior fly-off flights will be the same.

f) The flying order for each round shall be established by separate random draws.

g) At World and Continental Championships and other limited international contests, the flying order will be organized by groups: two groups (A and B) if the elimination rounds are organised on two days, three groups (A, B and C) on three days and four groups (A, B, C and D) on four days. The groups shall be established by a random draw and the flying order in each round for each group shall be established by separate random draws.

h) At World and Continental Championships and other limited international contests, all members of any single National Team shall be separated in the flying order of every round by at least one competitor from another nation. If two competitors from the same National Team are initially drawn to fly consecutively during any round, then the affected competitor will be redrawn to ensure that this separation requirement is met.

i) At World and Continental Championships and other limited international contests, the flying order for the four elimination rounds on a Double-Circle format will be organised as follows:

See the table overleaf

2 Groups on 2 Days				
	Circle A (Rounds 1 and 3)		Circle B (Rounds 2 and 4)	
	Morning	Afternoon	Morning	Afternoon
Day 1	Round 1 Group A	Round 1 Group B	Round 2 Group B	Round 2 Group A
Day 2	Round 3 Group B	Round 3 Group A	Round 4 Group A	Round 4 Group B
3 Groups on 3 Days				
	Circle A (Rounds 1 and 3)		Circle B (Rounds 2 and 4)	
	Morning	Afternoon	Morning	Afternoon
Day 1	Round 1 Group A	Round 1 Group B	Round 2 Group B	Round 2 Group C
Day 2	Round 1 Group C	Round 3 Group A	Round 2 Group A	Round 4 Group B
Day 3	Round 3 Group B	Round 3 Group C	Round 4 Group C	Round 4 Group A
4 Groups on 4 Days				
	Circle A (Rounds 1 and 3)		Circle B (Rounds 2 and 4)	
	Morning	Afternoon	Morning	Afternoon
Day 1	Round 1 Group A	Round 1 Group B	Round 2 Group D	Round 2 Group C
Day 2	Round 1 Group C	Round 1 Group D	Round 2 Group B	Round 2 Group A
Day 3	Round 3 Group B	Round 3 Group A	Round 4 Group C	Round 4 Group D
Day 4	Round 3 Group D	Round 3 Group C	Round 4 Group A	Round 4 Group B

Note: Circle A: odd rounds (1 and 3); Circle B: even rounds (2 and 4)

Definition and Number of Helpers

Each competitor is entitled to three helpers for each contest flight. At World and Continental Championships and at other limited international contests, a helper may be a Team Manager, another competitor, or an officially registered supporter.

Scoring

a) Every judge shall award points to every registered competitor during every official flight for every manoeuvre flown in the correct sequence. Judges shall only score each contestant's first attempt at each manoeuvre. The number of points awarded may vary between 1 point and 10 points. All marks between the 1 point minimum and the 10-point maximum shall be awarded in increments of a minimum of one tenth of a point (0.1). These marks are multiplied by a K-factor which varies with the difficulty of the manoeuvre.

b) In the description of the manoeuvres (see 4.2.15.3 to 4.2.15.17), the first numbered paragraph, "Start of manoeuvre", is also the point at which the judges shall start officially observing the manoeuvre in order to award points; and the last numbered paragraph "End of manoeuvre" is also the point at which the judges shall stop officially observing the manoeuvre and stop awarding points.

Note: the descriptions of the manoeuvres also include un-numbered paragraphs marked "Recommended entry procedure" and "Recommended exit procedure". These are recommendations for use by the contestants only and judges shall not officially observe these procedures, nor shall they award any points at all for these procedures, regardless of whether or not they are performed in accordance with the recommendations.

c) All judges shall award a mark 0 (zero) for:
   i) Manoeuvres omitted or not attempted at all.
   ii) Manoeuvres started but not completed.
   iii) Manoeuvres with an incorrect number of repeat figures (either too few or too many).
   iv) Manoeuvres flown out of the sequence.
   v) Manoeuvres flown without a minimum of 11/2 laps interval after the previous manoeuvre.
   vi) Manoeuvres performed after the maximum flight time of 7 minutes has elapsed.

d) When a manoeuvre is omitted or not attempted at all, the remaining manoeuvres shall be scored provided they are attempted in the correct order.

e) When performed after the completion of the four-leaf clover manoeuvre but before the start of the landing manoeuvre, other manoeuvring shall be permitted. All such manoeuvring shall not be officially observed nor scored by the judges.

f) The mark 0 (zero) shall be awarded for the landing manoeuvre if the official timekeeper confirms that the model aircraft comes to a complete stop at the end of the ground roll after the 7 minutes total time allowed for an official flight has expired. The mark 0 (zero) points shall also be awarded for the landing manoeuvre if:
   i) the model aircraft crashes.
   ii) or the model aircraft lands on its belly.
   iii) or the model aircraft lands upside-down.
   iv) or the model aircraft is fitted with a retractable landing gear and if this was not fully extended at the time of touch down, or if the retractable landing gear is apparently fully extended but if it collapses when touching down.
   v) or the model aircraft flips over at the moment of touching down.

Note: if the model aircraft flips over or noses-down during the ground rollout phase points may be awarded for the landing manoeuvre if in the opinion of the judges, the flip-over or nosing-down was due to adverse wind conditions, or poor ground surface conditions affecting what would otherwise be predicted as the model aircraft's normal ground roll after touching down.

g) If a crash interrupts an official flight, then every judge shall score all completed manoeuvres up to and including the last manoeuvre that was completed before the crash occurred. All other manoeuvres remaining in the sequence including the manoeuvre in which the crash occurred) shall be awarded a mark 0 (zero).

h) In co-operation with the F2B Contest Director, the Head Judge shall ensure that all scores awarded to a contestant for the respective official flight shall be discarded and scored 0 (zero) points if either of the following occur:
   i) the model aircraft fails the second official noise test (see paragraph 4.2.6).
   ii) any part(s) of the model aircraft become detached from the model aircraft (intentionally or otherwise) at any time from the moment of release for the take-off manoeuvre until the moment that the model aircraft first touches down from the landing manoeuvre. This does not apply to any part(s) of the model aircraft which detached during a crash, or a flip over, a belly or upside-down landing.

Judging

a) Aerobatic judges will be responsible for observing each attempt at an official flight and to record their awarded score for each manoeuvre as it is completed. Once an official flight has begun the judges may, of their own accord, change their original position, but such position change shall not exceed a maximum of 1/8 of a lap ahead of or behind their original position as at the beginning of the respective official flight. Judges shall only change position during the 1½ intervening laps flown between manoeuvres and not while any manoeuvre is being flown.

b) At Single-Circle format contests, the organiser must appoint a panel of at least three judges. In the case of World and Continental Championships and other limited international contests the panel of judges must be increased to five.

c) At Double-Circle format contests, the organiser must appoint a panel of three judges for each contest flight circle. For the fly-off rounds (World and Continental Championships and other limited international contests), the panel of judges is increased to 6 judges.

d) For each panel of judges, one judge is selected as Head Judge.

e) At World and Continental Championships and other limited international contests, all the judges shall be selected from a list of persons proposed by the National Airsports Controls for their proficiency and experience and approved by the CIAM.

f) One of the judges at World and Continental Championships and other limited international contests must not have judged at the previous equivalent Championship.

g) In Open International contests, only two judges must be approved by CIAM for each panel of judges.

h) At World and Continental Championships and other limited international contests, all the judges must be of different nationalities. In Open International contests, the judges must be of at least two nationalities for each panel of judges.

i) Each judge shall be permanently appointed to judge at a specific contest flight circle for the duration of the contest, except at contests which include a fly-off. At contests which include a fly-off (World and Continental Championships and other limited international contests), judges shall be appointed to a specific contest flight circle for the duration of all elimination rounds.

j) All judges appointed to the judging panel assigned to each contest flight circle shall judge every contest flight scheduled for their respective contest flight circle. But this requirement may be relaxed in exceptional circumstances, such as, but not limited to a judge becoming sick during a contest. In such event, the F2B Contest Director and the Head Judge shall confer (also together with an FAI Jury member) regarding the replacement of the missing judge.

k) At World and Continental Championships and other limited entry international contests, there will be at least one judges' calibration flight per contest day at each contest flight circle to be used. All such judges' calibration flights shall take place before any contest flights are scheduled. All judges' calibration flights shall include sufficient time for a judges' briefing before and judges' debriefing after each judges' calibration flight. Said briefing and debriefing shall include the complete panel/s of judges and shall be held privately, with no contest organiser, official, or competitor present. The provision of judges' calibration flights in Open International contests shall be optional but is recommended.

l) All contest organisers shall arrange at least one judges' meal break per contest day. If the judging panel/s request it, extra time shall also be scheduled for additional judges' breaks (for example breaks of approximately 10 minutes duration at approximately 2 hourly intervals throughout each round).

m) No judge shall be scheduled to perform a total of more than 9 hours of judging duty within any single contest day. This time shall include calibration flight(s) and briefings but shall not include the breaks.

n) Under extraordinary circumstances only, and with the unanimous approval of the judges' panel(s), the organiser may extend the time limit of the judges' workload.

Classification

a) The score for each manoeuvre corresponds to the original mark multiplied by the respective K-factor. The resulting scores for each manoeuvre shall then be added together to produce a single total score per judge. The resulting single total scores of the judges are totalled and then divided by the number of judges. The result will be rounded down to two decimal places (to the nearest lower 1/100th) to produce the competitor's final score per official flight.

Example: *945.9999 will be rounded down to 945.99*

945.9911 will be rounded down to 945.99

b) In Open International contests, the final position reached by all registered competitors ("placings") shall be processed as follows:

c) At World and Continental Championships and other limited entry international contests, score of each registered competitors ("placing") at the end of the last elimination round shall be processed as follows:

i) At Single-Circle format Championships, organisers shall take each competitor's two highest flight scores and add them together to produce the competitor's score.

ii) At Double-Circle format Championships, organisers shall take each competitor's highest score from each contest flight circle, add them together to produce the competitor's score.

iii) If, due to extraordinary circumstances, only two complete rounds were flown, then each competitor's score from the two completed rounds shall be used.

The final placing of the finalists will be processed as follows: each competitor's two highest fly-off round scores shall be added together, and the resulting total shall then be divided by two. The result shall be rounded down to two decimal places. In case of ties, the third fly-off score of the affected competitors shall be used to determine the final placings. If, due to extraordinary circumstances, only two complete fly-off rounds were flown then each competitor's fly-off score from the two completed fly-off rounds shall be used for final placings.

The results of the specific junior fly-off will serve to rank those top juniors but will not affect the general results.

The classification of the non-finalists will be done according to their score at the end of the last elimination round. In case of ties:

iv) at Single-Circle format Championships, the third flight score of the affected competitors shall be used to determine placings of the affected competitors;

v) at Double-Circle format Championships, second highest score from any of the contest flight circles shall be used to determine placings of the affected competitors.

In the case of a two-way tie for 15th place at the end of the last elimination round, the following competitor is placed 17th; in the case of a three-way tie for 15th place the following competitor is number 18th etc.

d) To establish the national scores for team classification, add the numerical placing of the three team members of each nation. Teams are ranked according to the lowest numerical sum of placings to highest, with complete three-competitor teams ahead of two-competitor teams which in turn are ranked ahead one-competitor teams.

e) At World and Continental Championships and other limited entry international contests, facsimile copies of the judges' original score sheets from each official flight shall be given to the respective Team Manager or Assistant Team Manager before the competitor's next flight in the contest, or at the latest at the end of each round of the contest.

f) At all World Cup contests, facsimile copies of the judges score sheets from each official flight shall be given to the respective competitor before the competitor's next flight in the contest or at the latest at the end of each round of the contest.

Starting Procedure

a) Each competitor shall be allowed 3 minutes preparation time to enter the circle, to place his model aircraft at the selected starting position, to position the judges and to prepare his motor(s) for starting.

b) The competitor may choose to start, warm-up and stop his motor(s) during the preparation time, and he must inform the timekeeper if it is his intention to do so.

c) Immediately after the preparation time he shall be allowed a 7-minute flight time in which to complete his manoeuvres.

d) The preparation time shall start when the competitor is officially called to perform his contest flight.

e) The timekeeper shall signal the beginning of the preparation time to the competitor and the judges.

f) The preparation time shall end, and the Flight time shall start when:

i) The timekeeper registers that the 3 minutes preparation time has elapsed.

ii) The competitor gives a clear hand signal to the timekeeper, indicating that he is ready to start his motor(s).

iii) The competitor starts his motor(s) for warm-up without receiving permission from the timekeeper.

g) The timekeeper shall signal to the competitor and the judges when the flight time starts. If no hand signal is given by the competitor prior to starting his motor(s), or he starts his warm-up without receiving permission, then the timekeeper shall notify the judges of this.

h) The timing of an official flight shall stop the moment that the model aircraft has come to a full stop at the end of the ground roll that completes the Landing Manoeuvre.

i) The competitor shall remove his model aircraft, lines and handle from the flight circle immediately after he has completed his flight.

Execution and Sequence of Manoeuvres

a) The sequence of manoeuvres with their corresponding K factor is:

Sequence	Manoeuvre	K
1.	Starting	0
2.	Take-off	2
3.	Reverse wing-over	8
4.	Three consecutive inside loops	6
5.	Two consecutive laps of inverted level flight	2
6.	Three consecutive outside loops	6
7.	Two consecutive inside square loops	12
8.	Two consecutive outside square loops	12
9.	Two consecutive inside triangular loops	14
10.	Two consecutive horizontal eights	7
11.	Two consecutive square horizontal eight	18
12.	Two consecutive vertical eight	10
13	Hourglass	10
14.	Two consecutive overhead figure eight	10
15.	Four-leaf clover	8
16.	Landing	5

b) All manoeuvres must be executed in the order of the list.

c) Every competitor shall leave at least 1½ laps (including the recommended entry and exit procedure detailed for each manoeuvre) to create a pause period between the end of one manoeuvre and the start of the next. The level portion of the 1½ intervening laps shall be flown at a height of between 1 and 3 metres. Judges shall not however officially observe any of these pause periods but instead shall use this time to enter the score awarded for the previous manoeuvre onto the competitor's score sheet before the next manoeuvre is started.

Description of Manoeuvres

a) The diagrams of the manoeuvres displaying the pilot's view are to be found in Annex 4J. They are an integral part of the rules and must be read in conjunction with the manoeuvre descriptions

b) The F2B Judges' Guide is at Annex 4B.

Terminology and Wording

a) Wording and phraseology used in the F2B manoeuvre descriptions define the track of a control line model aircraft flying anticlockwise on the surface of a hemisphere.

Wording	Definition
Manoeuvre:	Means the full total of figures and segments necessary to complete the manoeuvre marked under a separate numbered heading with bold type. For example, the take-off manoeuvre, the three consecutive inside loops manoeuvre, and the single four-leaf clover manoeuvre, are all referred to as a single whole manoeuvre throughout this text.
Figure:	Means a shape, which makes up a separately recognisable complete part of a whole manoeuvre. For example, the first loop of the three consecutive inside loops manoeuvre is referred to as a figure; but the

Wording	Definition
	first loop which makes the first half of the first complete figure eight in the two consecutive overhead eight manoeuvre is not referred to as a figure.
Segment:	Means a specifically defined part of a figure (or of a whole manoeuvre) in which certain particular points are detailed. For example, the first loop which makes the first half of the first complete figure eight in the two consecutive overhead eight manoeuvre is referred to as a segment.
Upright:	Means the model aircraft flying in its "normal" upright attitude (that is: with its landing gear nearest to the ground).
Inverted:	Means the model aircraft flying in an attitude which is the reverse of upright flight (colloquially, the model aircraft is "flying on its back", is "flying upside-down", or is "flying inverted").
Flight hemisphere:	Means a half globe shape whose base is level above the ground.
Parallel:	Means an imaginary line on the surface of the flight hemisphere equidistant to the equator of the flight hemisphere and marking the latitude.
Base:	Means the base of the flight hemisphere. This lies at a height of 1.5m above the centre of the flight circle.
Level:	Means at right angles to the direction aligned with the direction of the force of gravity, as materialised with a plumb line.
Flight circle:	Means a horizontal circle whose radius is equal to the flight radius.
Horizontal:	Means flight along or parallel to the base
Vertical:	Means flight at right angles to the base, along an imaginary circle on the surface of the flight hemisphere marking the longitude.
Straight line	A great circle path or part thereof.
Momentary or momentarily:	Is used throughout this text in their original dictionary definition sense (that is: something, which lasts only for a very brief period of time). So, for example, the very short period during which the model aircraft is required to be in a vertically banked "knife-edge" attitude above the competitor's head during the two consecutive overhead eights manoeuvre is described in this text as "momentarily".
Lateral reference:	This is an imaginary line drawn at right angles (90 degrees) to the horizontal and is used as a reference line when flying and scoring the size, positioning, symmetry and the superimposition of various figures and manoeuvres.
Wingover path:	Means the vertical climbing and diving flight path defined as a segment of the single reverse wingover manoeuvre.

Starting

Engines may be started manually or using an electric or mechanical starter.

Take-off Manoeuvre

a) Start of manoeuvre:

The moment when the model aircraft begins its ground roll. The model aircraft must take-off from the ground.

To prevent uncontrolled movement or flight of the model caused by an accidental motor run, electric powered model aircraft must be restrained by the pilot, by an assistant, or by a mechanical device until the pilot is holding the handle.

b) Ground roll and lift off segment:

Before lifting off the model aircraft should run along the ground for a distance, of not less than 4.5 metres and not more than 1/4 of a lap. The lift-off should be smooth, meaning without a "sudden jump" into the air.

c) Take-off and levelling-off segment:

The model aircraft should maintain a constant rate of climb until reaching the base of the flight hemisphere. The base lies horizontal at a height of 1.5 m above the centre of the flight circle. The point of changing from climbing flight to level flight should occur exactly over the point of release at the beginning of the take-off ground roll. The transition into upright level flight should be smooth and gentle with no sudden changes.

d) Two laps of upright level flight segment:

After levelling off, the model aircraft should maintain level flight at the height of the base (+/- 30 cm) and should fly 2 complete laps of stable and smooth normal upright flight without deviation.

e) End of manoeuvre:

At the end of the third lap, exactly overhead the point of beginning the take-off ground roll.

Recommended exit procedure: Continue normal upright level flight at the height of the base.

Reverse Wing-over Manoeuvre

Note: All corners in this manoeuvre must be smooth, precise and shall be of a tight radius.

Recommended entry procedure: From normal upright level flight at the height of the base.

a) Start of manoeuvre:

At the beginning of the 1st turn from normal upright level flight at the height of the base,

(+/- 30 cm) into a vertical climb.

a) The first vertical climb and dive segment:

The model aircraft turns sharply into a vertical climb and should then maintain this climb at right angles to the base. It should pass over the flyer's head and then continue into a dive that is also at right angles to the base, until reaching the 2nd turn, at which point the model aircraft should turn sharply from its dive into inverted level flight at the height of the base, (+/- 30 cm).

b) The inverted horizontal level flight segment:

After recovery from the vertical dive and until the start of the 2nd vertical climb, the model aircraft should fly a segment of steady inverted flight along the base (+/- 30 cm), with no deviations from the established height. The length of this segment, including turns, should be ½ of a lap.

c) The second vertical climb and dive segment:

At the 2nd vertical climb, the model aircraft should turn sharply into a vertical climb and should then maintain a climb that is at right angles to the base. The model aircraft should pass over the flyer's head and then continue into a dive that is also at right angles to the base. At the 4th turn, the model aircraft should turn sharply from its dive into normal level upright flight at the height of the base (+/- 30 cm). The point where the model aircraft starts its recovery turn into normal level upright flight at the end of the completed manoeuvre should be exactly opposite the point where the model aircraft first reached the 2nd vertical climb at the start of the manoeuvre, and at the same height.

d) End of manoeuvre:

the end of the 4th turn (recovery to normal upright level flight).

Recommended exit procedure: Continue normal upright level flight at the height of the base.

Three Consecutive Inside Loops Manoeuvre

Manoeuvre size: The tops of the loops are tangent to the 45-degree parallel.

Recommended entry procedure: The manoeuvre is entered from normal level upright flight at the height of the base.

a) Start of manoeuvre:

At the start of the first loop, as the model aircraft departs normal upright level flight.

b) The first loop figure:

From normal upright level flight at the height of the base, the model aircraft should fly upwards along a circular flight path until reaching the 45° parallel. At that point, the model aircraft should be inverted. It should continue along its circular flight path downwards until reaching the bottom of the loop at the height of the base (+/- 30 cm), in upright flight. When the model aircraft reaches a vertical attitude for the first time, this has defined the lateral reference for the whole manoeuvre.

c) The second and third loop figures:

The model aircraft should follow a flight path exactly as described above. The second and third loops should be placed in exactly the same position as the first loop and should be of exactly the same size.

d) End of manoeuvre:

At the end of the third loop, as the model aircraft completes recovery into normal upright level flight.

Recommended exit procedure: The model aircraft should continue for another ½ loop, recovering inverted and descending to the normal inverted flight level within ½ a lap, remaining inverted at the height of the base.

Two Consecutive Laps of Inverted Level Flight Manoeuvre

Recommended entry procedure: The manoeuvre is entered from inverted level flight at the height of the base.

a) Start of manoeuvre:

At the start of the third lap after the exit from the previous manoeuvre.

b) Two laps of inverted flight:

The model aircraft should maintain 2 complete laps of smooth and stable inverted flight at the height of the base (+/- 30 cm). The model should not deviate from the established flight height.

c) End of manoeuvre:

At the end of the fourth lap after the exit from the previous manoeuvre.

Recommended exit procedure: Continue inverted flight, remaining at the height of the base until entry into the next manoeuvre.

Three Consecutive Outside Loops Manoeuvre

Manoeuvre size: The tops of the loops are tangent to the 45-degree parallel.

Recommended entry procedure: From inverted level flight at the height of the base.

a) Start of manoeuvre:

The manoeuvre starts at the height of the base where the model aircraft begins the 1st loop.

b) The first loop figure:

From inverted level flight at the height of the base, the model aircraft should fly upwards along a circular path until reaching the 45-degrees parallel. At this point it should be upright. The aircraft should continue its circular flight path downwards until passing the bottom at the height of the base (+/- 30 cm) in inverted flight. The whole flight path should be circular and smooth with no deviations or flat spots. When the model aircraft reaches a vertical attitude for the 1st time, this has defined the lateral reference for the whole manoeuvre.

c) The second and third loop figures:

The model aircraft should follow a flight path exactly as described above. The second and third loops should be placed in exactly the same position as the first loop and should be of exactly the same size.

d) End of manoeuvre:

At the end of the 3rd loop, as the model aircraft reaches the height of the base, in inverted level flight.

Recommended exit procedure: Continue for another half loop, recovering to upright flight and then descending to the normal upright level height at the height of the base.

Two Consecutive Inside Square Loops Manoeuvre

Note: All corners in this manoeuvre must be smooth, precise and shall be of a tight radius.

Manoeuvre size: The tops of the loops are flown along the 45-degree parallel. Width is ⅛ of a lap.

Recommended entry procedure: From normal upright level flight along the base.

a) Start of manoeuvre:

The manoeuvre starts at the point where the model aircraft begins its 1st turn into a vertical climb from normal level upright flight along the base (+/- 30 cm).

b) First loop figure – 1st turn and climbing segment:

The model aircraft should turn sharply into, and then maintain a climb that is at right angles to the base.

c) First loop figure - 2nd turn and top segment:

The model aircraft should turn sharply into, and then maintain inverted level flight along the

45-degree parallel.

d) First loop figure – 3rd turn and diving segment:

The aircraft should turn sharply into, and then maintain, a dive that is at right angles to the base.

e) First loop figure – 4th turn and bottom segment:

The 1st loop is completed when the model aircraft turns sharply into, and then maintains upright level flight along the base (+/- 30 cm). The total length of the bottom segment, including both turns, should be ⅛ of a lap.

f) The second loop figure:

The model aircraft should follow a flight path exactly as described in the segments above. The second loop should be placed in exactly the same position as the first loop and should be of exactly the same size.

g) End of manoeuvre:

The manoeuvre is completed in normal level upright flight along the base at the point where the model aircraft started its 1st turn into a vertical climb at the beginning of the complete manoeuvre.

Recommended exit procedure: Maintain normal upright level flight along the base.

Two Consecutive Outside Square Loops Manoeuvre

Note: All corners in this manoeuvre must be smooth, precise and shall be of a tight radius.

Manoeuvre size: The tops of the loops are flown along the 45-degree parallel. Width is ⅛ of a lap.

Recommended entry procedure: Use ¾ of a lap to climb to the height of the 45-degree parallel. Proceed along the 45-degree parallel for ⅛ of a lap.

a) Start of manoeuvre:

The manoeuvre starts at the point where the model aircraft begins its 1st turn into a vertical dive from the 45-degree parallel.

b) First loop figure - first turn and diving segment:

The model aircraft should turn sharply into, and then maintain a dive that is at right angles to the base.

c) First loop figure - 2nd turn and bottom segment:

At the height of the base, the model aircraft should turn sharply into, and then maintain inverted level flight along the base (+/- 30 cm) without any deviation. The total length of the bottom segment, including both turns, should be ⅛ of a lap.

d) First loop figure - 3rd turn and climbing segment:

The model aircraft should then turn sharply into, and then maintain a climb that is at right angles to the base

e) First loop figure - 4th turn and top segment:

The model aircraft should turn sharply into, and then maintain upright level flight along the 45-degree parallel.

f) The second loop figure:

The model aircraft should follow a flight path exactly as described in the segments above. The second loop should be placed in exactly the same position as the first loop and should be of exactly the same size.

g) End of manoeuvre:

The manoeuvre is completed in upright level flight on the 45-degree parallel at the same point where the model aircraft started its 1st turn at the beginning of the complete manoeuvre.

Recommended exit procedure: Maintain upright level flight along the 45-degree parallel for at least 5.0 m after the end of the manoeuvre and then descend to normal upright level flight at the height of the base within approximately 1/2 a lap.

Two Consecutive Inside Triangular Loops Manoeuvre

Note: All corners in this manoeuvre must be smooth, precise and shall be of a tight radius. In each turn the model aircraft should change its angle of pitch attitude by approximately 120 degrees.

Manoeuvre size: The top turn is tangent to the 45-degree parallel, and the width is slightly more than ⅛ of a lap.

Recommended entry procedure: From normal level upright flight along the base.

a) Start of manoeuvre:

The manoeuvre starts when the model aircraft begins its 1st turn from normal level upright flight along the base (+/- 30 cm).

b) First triangle figure – 1st turn and climb segment:

The model aircraft should turn sharply into an inverted climb at 30 degrees beyond vertical in relation to the base and maintain this flight path until starting the 2nd turn.

c) First triangle figure – 2nd turn and dive segment:

The model aircraft should then turn sharply into an inverted dive at an angle of 30 degrees to vertical. The height reached during this 2nd turn should be equal to the height of the 45-degree parallel. After completing the 2nd turn, the model aircraft should maintain this flight path until starting the 3rd turn.

d) First triangle figure - 3rd and bottom segment:

The aircraft should then turn sharply into upright level flight along the base (+/- 30 cm).

e) The second triangular loop figure:

The model aircraft should follow a flight path exactly as described in the three segments above. The second loop should be placed in exactly the same position as the first loop and should be of exactly the same size.

f) End of manoeuvre:

With the model aircraft in normal upright level flight, at the point where the model aircraft started its first turn at the start of the complete manoeuvre.

Recommended exit procedure: Continue normal upright level flight along the base.

Two Consecutive Horizontal Eights Manoeuvre

Manoeuvre size: The tops of the loops are tangent to the 45-degree parallel.

Recommended entry procedure: From normal upright level flight at the height of the base.

a) Start of manoeuvre:

The manoeuvre starts when the model aircraft passes the intersection point for the first time.

Note: When the model aircraft reaches a vertical climbing attitude for the first time, this has defined the intersection point for the whole manoeuvre (ie after ¼ of the 1st loop of the 1st eight has been flown).

b) The first eight figure - first inside loop segment:

From normal upright level flight, the model aircraft should fly upwards along a circular flight path to the height of the 45-degree parallel, at which point it should be inverted. The model aircraft should continue its circular flight path downwards until reaching normal level upright flight at the height of the base (+/- 30 cm), at which point it should be upright. The model aircraft should then continue its circular flight path for a further ¼ of a loop until reaching the intersection point.

Note: The intersection point, first defined by the model aircraft at the beginning of this manoeuvre should be maintained throughout the whole of the manoeuvre. At the time of passing through the intersection point and transitioning to the 1st outside loop, the model aircraft should be momentarily in a vertical nose-up attitude but should not visibly travel along a vertical climbing flight path.

c) The first eight figure – the outside loop segment (actually one complete loop from the intersection point onwards):

After passing through the intersection point, the model aircraft should continue to fly, without interruption, a complete outside loop by flying upwards along a circular flight path to the height of the 45-degree parallel, at which point the model aircraft should be upright. It should then continue its circular flight path downwards until reaching the height of the base (+/- 30 cm) in inverted flight. The model aircraft should then continue its circular flight path for a further ¼ of a loop until reaching the intersection point, where it should be momentarily vertical.

d) The second complete eight figure:

The model aircraft should follow a flight path exactly as set out in the individual segments above. The second figure eight should be flown in exactly the same position and should be of exactly the same size as the first eight figure.

e) End of manoeuvre:

The manoeuvre is completed when the model aircraft completes the 2nd eight figure, when passing the intersection point in a vertical climb for the 5th and last time.

Recommended exit procedure: After passing the intersection point for the last time, continue the circular flight path for approximately a further 135 degrees of arc, until levelling out into normal upright level flight at the height of the base.

Two Consecutive Horizontal Square Eights Manoeuvre

Note: All corners in this manoeuvre must be smooth, precise and shall be of a tight radius.

Manoeuvre size: The top segments of the loops are flown along the 45-degree parallel. Width is ¼ of a lap.

Recommended entry procedure: From normal upright level flight at the height of the base.

a) Start of manoeuvre:

With the model aircraft in normal upright level flight along the base (+/- 30 cm), from the point where the model aircraft starts its first turn upwards into a vertical climb for the first time.

Note: when the model aircraft reaches a vertical climbing attitude for the first time, this has defined the intersection line for the whole manoeuvre.

b) The first eight figure – the 1st climbing turn and vertical climbing segment of the 1st (inside) square loop:

The model aircraft should turn sharply into a vertical climb, reaching and maintaining a flight path that is at right angles to the base.

c) The first eight figure – the 2nd turn and top segment of the 1st (inside) square loop:

The model aircraft should turn sharply into inverted level flight to reach the height of the 45-degrees parallel as it becomes inverted. The top segment should be flown along the 45-degree parallel.

d) The first eight figure - the 3rd turn and vertical dive segment of the 1st (inside) square loop:

The model aircraft should turn sharply into a vertical dive, reaching and maintaining a flight path that is at right angles to the base.

e) The first eight figure - the 4th turn and bottom segment of the 1st (inside) square loop:

The model aircraft should turn sharply into upright level flight and this section should be flown along the base (+/- 30 cm). The length of the whole bottom segment, including both turns, should be ⅛ of a lap.

f) The first eight figure - the 1st climbing turn and vertical climb segment of the 2nd (outside) square loop:

At the end of the previous segment (paragraph e) above), the model aircraft should turn sharply into a vertical climb, reaching and maintaining a flight path which is at right angles to the base. This flight path should be in exactly the same position as defined by the model aircraft at the beginning of the manoeuvre (paragraph a) above).

g) The first eight figure - the 2nd turn and top segment of the 2nd (outside) square loop:

The model aircraft should turn sharply into upright level flight to reach the height of the

45-degree parallel as it becomes level. The top segment should be flown along the 45-degree parallel.

h) The first eight figure - the 3rd turn vertical dive segment of the 2nd (outside) square loop:

The model aircraft should turn sharply into a vertical dive, reaching and maintaining a flight path that is at right angles to the base.

i) The first eight figure - the 4th turn and bottom segment of the 2nd (outside) square loop:

The model aircraft should turn sharply into inverted level flight, and this section should be flown along the base (+/- 30 cm). The length of the whole bottom segment, including both turns, should be ⅛ of a lap.

j) The second eight figure:

The model aircraft should follow a flight path exactly as set out in the individual segments above. The second eight figure should be flown in exactly the same position and should be of exactly the same size as the first eight figure.

k) The final turn and last vertical climb exit from manoeuvre segment:

At the end of the 2nd bottom segment of the 4th loop the model aircraft should again turn sharply into a vertical climb, reaching and maintaining a flight path which is at right angles to the base. This flight path should be in exactly the same position as defined by the model aircraft at the start of the manoeuvre (paragraphs a) and b) above).

l) End of manoeuvre:

At the end of the last vertical climb segment, before turning into normal upright exit flight along the 45-degree parallel.

Recommended exit procedure: Complete a further 90 degrees turn into upright level flight along the 45-degree parallel. Maintain this flight path until clear of the left-hand side of the left hand loop by approximately 5.0 metres then make a turn into a dive of approximately 45-degrees nose down attitude. Recover into normal upright level flight at the height of the base.

Two Consecutive Vertical Eights Manoeuvre

Manoeuvre size: Height is 90 degrees line elevation angle to the base.

Recommended entry procedure: From normal upright level flight at the height of the base, fly upward along a circular flight path to reach the height of the 45-degree parallel. At this point the model aircraft should be inverted.

a) Start of manoeuvre:

After the model aircraft has flown the 1st half of an inside loop, as it passes through the intersection point for the first time.

Note: the intersection of the whole manoeuvre is defined when the model aircraft passes through inverted level flight at the height of the 45-degree parallel for the first time.

b) The first eight figure – the 1st (inside loop) segment:

As the model aircraft passes through the intersection point for the first time it should continue to fly a circular inside loop. The bottom of this loop should be at the height of the base (+/- 30 cm). The loop should be completed by the model aircraft continuing this circular flight path until reaching an inverted attitude at the height of the 45-degree parallel.

c) The first eight figure - the 2nd (outside loop) segment:

As it passes through the intersection point the model aircraft should continue flying a circular outside loop. The bottom of this 2nd loop should be at the height of the 45-degree parallel, and the top should be at 90 degree line elevation angle.

Note: the flight path of this 2nd loop should touch the intersection point, and this intersection point should be maintained throughout the entire manoeuvre. At the time of passing through the intersection point and then transitioning into the 2nd (outside) loop, the model aircraft should be momentarily in a level inverted flight attitude but should not visibly follow a straight flight path. The model aircraft should neither climb nor dive during this momentary period of inverted flight. In addition, the centres of both loops should be positioned on an imaginary line drawn upwards from the base at right angles.

d) The second eight figure:

The model aircraft should follow a flight path exactly as set out in the individual segments above. The 2nd eight figure should be flown in exactly the same position and should be of exactly the same size as the 1st eight figure.

e) End of manoeuvre:

As the model aircraft completes the 2nd eight figure, at the moment when it reaches inverted level flight at the height of the 45-degree parallel.

Recommended exit procedure: Continue for a further ½ inside loop until the model aircraft is upright at the height of the base and then continue in normal level upright flight.

Hourglass Manoeuvre

Note: All corners in this manoeuvre must be smooth, precise and shall be of a tight radius. In each turn the model aircraft should change its angle of pitch attitude by approximately 120 degrees.

Manoeuvre size: Height is 90 degrees line elevation angle to the base. Width is slightly more than ⅛ of a lap.

Recommended entry procedure: From normal upright level flight at the height of the base.

a) Start of manoeuvre:

The manoeuvre starts from the point where the model aircraft starts its 1st turn from the base (+/- 30 cm) into a climb for the first time.

b) The first turn and inverted climb segment:

The model aircraft should turn sharply into and then maintain an inverted climb with a flight path angled at approx. 30 degrees past the right angle (relative to the base). The climb should be continued until the model reaches the wingover flight path, positioned at 90 degrees to the centre line axis of the whole manoeuvre, where the model aircraft makes a sharp outside turn to follow this wingover flight path, and the middle point of this flight path should be positioned directly above the centre of the circle.

c) The overhead and dive 2nd turn, wingover, and 3rd turn segment:

The length of the overhead segment, including its 2 turns, should be slightly more than ⅛ of a lap. This segment should be followed by a sharp outside turn through approx. 120 degrees into an inverted dive, which is maintained on a flight path angled at approx. 30 degrees to the base.

d) The intersection:

The intersection of the climb and dive flight paths should be at the height of the 45-degree parallel.

e) The fourth turn and bottom level flight segment:

At the completion of the dive segment, the model aircraft should turn sharply into normal upright level flight at the height of the base (+/- 30 cm). The bottom segment shall be flown along the base maintaining the established height. The length of this segment, including 2 turns, should be slightly more than ⅛ of a lap

f) Symmetry of the complete manoeuvre:

The complete figure should be flown symmetrically in relation to its vertical centre line axis and this centre line axis should be at right angles to the base.

g) End of manoeuvre…the complete manoeuvre.

Recommended exit procedure: Continue in normal upright level flight along the base.

Two Consecutive Overhead Eights Manoeuvre

Manoeuvre size: The top of loops shall be directly over the centre of the circle and lowest points of both loops must being tangential to the 45-degree parallel.

Recommended entry procedure: From normal upright level flight the model aircraft should climb in a Wingover flight path to a point directly over the centre of the circle.

a) Start of manoeuvre:

As the model aircraft passes through the overhead point for the first time.

b) The intersection:

The intersection point of the complete manoeuvre should be directly over the centre of the circle and should be maintained throughout this entire manoeuvre.

c) The first (inside loop) segment:

From the overhead position, the model aircraft should fly a circular inside loop, returning to the overhead (intersection) point. The right-hand bottom of this loop should be at the height of the 45-degree parallel. This loop should be positioned symmetrically on an imaginary line on the face of the flying hemisphere, which is drawn upwards at 90 degrees to the axis of the model aircraft's wingover climb to the intersection point.

d) The passage through the intersection point and transition into the 2nd (outside) loop segment:

As the model aircraft passes through the intersection/overhead point, it should smoothly transition into the 2nd (outside) loop without flat spots or deviations. At the point of flying directly above the centre of the circle the model aircraft should be momentarily in a "knife edge" position with a line elevation angle of 90 degrees.

e) The second (outside loop) segment:

From the overhead position, the model aircraft should transition smoothly into the 2nd circular (outside) loop, completing this loop when it has again returned to the overhead/ intersection point. The left-hand bottom of this loop should be at the height of the 45-degree parallel. This loop should be positioned symmetrically on an imaginary line on the face of the flying hemisphere, which is drawn upwards at 90 degrees to the axis of the model aircraft's wingover climb to the intersection point.

f) The second eight figure:

The model aircraft should fly the 2nd eight figure exactly as set out in the individual segments above and this 2nd eight figure should be flown in the same position and of the same size as the 1st eight figure.

Recommended exit procedure: Continue by completing the 2nd (diving) half of the wingover flight path that was flown to start the manoeuvre. Recover into normal upright level flight at the height of the base.

Four-leaf Clover Manoeuvre

Manoeuvre size: Between the base and the top of the hemisphere. All loops shall be flown as ¾ of a circle arc of equal diameter.

Recommended entry procedures: The pilot may choose the entry procedure he wishes to perform.

- Climb to the estimated level of the horizontal connecting flight paths and maintain for approx. ¼ of a lap. Turn up towards the 9 o'clock position of the first inside loop.

or:

- From upright level flight along the base via an inside turn into a vertical climb towards the 9 o'clock position of the first inside loop.

Note: The vertical reference line of the manoeuvre is defined when the model aircraft passes vertically through the 9 o'clock entry position of the first inside loop.

a) Start of manoeuvre: The manoeuvre starts at the 9 o'clock position of the first inside loop.
b) The first inside loop: The top of this loop shall be tangent to a vertical great-circle line (wingover path) which is oriented at right angles to the vertical reference line. The loop ends with the model aircraft recovering into level flight touching a great-circle line inclined up 45° upwards.
c) The connecting flight path from the first to the second loop shall be flown in upright flight along a great-circle line inclined up 45° upwards, ending at the beginning of the second outside loop.
d) The second outside loop: The bottom of this loop shall be tangent to the base. This loop ends with the model aircraft entering a vertical climb along the vertical reference line.
e) The connecting vertical flight path from the second to the third loop shall be flown as a vertical climb along the vertical reference line to the beginning of the third outside loop.
f) The third outside loop: The top of this loop shall be tangent to a vertical great-circle line (wingover path) which is oriented at right angles to the vertical reference line. The loop ends with the model aircraft recovering into inverted flight touching a great-circle line inclined up 45° upwards.
g) The connecting flight path from the third to the fourth loop shall be flown in inverted flight along a great-circle line inclined up 45^{O} upwards, ending at the beginning of the fourth inside loop.
h) The fourth inside loop: The bottom of this loop shall be tangent to the base. This loop ends with the model aircraft entering a vertical climb along the vertical reference line.
i) End of manoeuvre: The manoeuvre ends at the point when the model aircraft passes the top of the hemisphere in vertical climb.

Recommended exit procedure: Descend to upright level flight along the base.

Note: Execution of further manoeuvres after the completion of the 4-leaf Clover manoeuvre is permitted.

Landing Manoeuvre

Recommended entry procedure: The manoeuvre is entered from normal upright level flight at the height of the base.

a) Start of manoeuvre:

As the model aircraft leaves level flight at the height of the base (+/- 30 cm) and with the motor/s and propeller/s stopped.

Note: For the purpose of this rule, the word "stopped" describes a situation where the blades of the propeller(s) are actually at a standstill or are rotating so slowly that the individual blades can clearly be seen by an observer.

b) The descent segment:

The model should fly for 1 full gliding lap with the motor/s and propeller/s stopped. This lap is measured from the start of the descent from the height of the base (+/-30cm) until the point of touchdown. The model should continuously descend from level flight to touchdown with no deviation from a straight flight path. The touch down itself should be smooth and either a "2 point" or a "3 point" touch down shall be judged as equally correct.

c) End of manoeuvre:

The manoeuvre is complete when the model aircraft comes to a complete stop after touching down at the end of the ground roll which is clearly in a forward's direction and in line with its normal flight motion. The length of the ground roll shall not exceed one lap.

At the end of the ground roll, electric powered model aircraft must be restrained by an assistant until the power system is secured against accidental motor start. The pilot must remain in the centre of the circle, and he must not release the control handle until the model aircraft has been restrained. Failure to comply will result in the loss of all landing points.

Concours d'Elégance

At F2B Continental and World Championships the organiser may arrange a contest for registered F2B pilots competing in F2B with own-constructed Class F2B model airplanes. The winner is awarded the FAI Concours d'Elégance Diploma.

The guide to the Concours d'Elégance contest is at Annex 4M.

F2C CLASS F2C – CL TEAM RACING

F2C.1 Team Racing Event

A team racing event is a contest where all races start with three model aircraft (hereinafter called 'the model') except when, in exceptional cases, a race may begin with two or one model(s). The models are flown simultaneously in the same circuit, for a specified number of laps. The competitor's contest result is determined by a series of qualifying, semi-final, and final race times. The conduct of the contest is controlled by a Panel of Judges (hereinafter called 'the Judges'). The Judges may use video recording equipment, located in the Judge's Tower, to monitor the pilots and the pilot circle. At the discretion of the Judges this official recorded video can be used, after the race, as a judging aid.

a) Team
   i) Each team consists of one pilot and one mechanic. No member of a team may be a member of another team.
   ii) The pilot's only function is to control the model and during the race, while his model's engine is running, he must remain in the centre circle.
   iii) The mechanic's only function is to fuel, adjust, and start the model's engine and during the race he must remain outside the flight circle. The engine must be started by flicking the propeller by hand.
   iv) During practice and races, the mechanic must wear a safety helmet, with a fastened chinstrap, strong enough to withstand the impact of a flying model. The pilot must have a safety strap connecting his wrist to the control handle.

b) Race
   i) Qualifying and semi-final races are run over 100 laps (10 km); two pitstops (landing for refuelling) are mandatory. The final race is run over 200 laps (20 km); four pitstops are mandatory.
   ii) Each team's race begins with a 'start' signal and finishes when the first condition of the five listed below is met:
      a) All models have completed the required laps, or
      b) the team is unable to continue racing, or
      c) the team has been disqualified, or
      d) when the judges declare "Stop racing – safety" or
      e) the race maximum time limit has been reached.
   iii) The maximum time limit of a race is 6 minutes for qualifying and semi-final races, and 12 minutes for the final race.
   iv) Each team's result is registered for that race.

F2C.2 Team Racing Site

A team racing site consists of four concentric circles marked, in contrasting colour, on a flat, prepared surface of concrete, asphalt, terrazzo, etc as described in Annex 4F- the Control line Organisers Guide.

The flight circle is a 19.6 m radius solid line that defines the model's "landing zone" (Centre Line of model inside the circle) and the model's "pitting areas" (outside the circle). The circle is divided into six equally spaced (60 degrees apart) sectors with each sector marked by two lines, one metre apart, on the outside of the flight circle to define the six pitting areas.

The safety circle is a 19.1 m radius broken line that defines the point beyond which the pitman is not permitted to reach to retrieve a model.

The centre circle is a 3 m radius solid line: the pilots may not put a foot outside the line except during the start and at pit stops. The centre of this circle shall be marked with a reference contrasting colour spot of 0.3 m diameter.

The inner circle is a 2 m radius broken line (marked in a contrasting colour to the centre circle) that is a reference circle for the pilots.

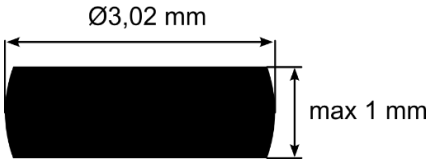
Prior to the start of the contest, the Judges shall verify the dimensions of all the circle markings and announce to the competitors any variations from the requirements and their interpretations of the variations.

F2C.3 Team Racing Model, Engine and Control System

A team racing model is an aircraft with thrust provided by a piston engine, lift provided by fixed aerodynamic surface(s), and pitch control provided by movable aerodynamic surfaces (elevator).

F2C.4 The engine characteristic shall be:

a) A maximum swept volume of 2.5 cm^3.
b) Naturally aspirated via a single round venturi with a maximum inside diameter of 3 mm.
c) The venturi diameter shall be checked with a simple no-go plug gauge, per the following sketch:
d) Any interconnecting chamber between the air intake and the induction port of the motor shall



have a maximum volume of 1.25 cm^3. No intentional air leakage is allowed between the venturi and the crankcase and there shall be no supplementary air induction except for sub piston induction to a maximum height of 0.6 mm at the exhaust port. The sub piston induction shall be measured with a cylindrical no-go gauge pin 0.61 mm diameter. This gauge pin must not be able to enter the opening below the piston in the exhaust port. The gauge pin must be able to be presented at the cylinder bore and piston face working surfaces, any other points of the cylinder, crankcase or other components of the engine must not obstruct the gauge pin. A single round supplementary fuel jet with a maximum diameter of 0.4 mm may be used between the venturi and the induction port of the engine.

e) The maximum exhaust outlet area is 60 mm^2 projected at the cylinder exhaust port or crankcase exhaust outlet whichever is smaller. If a silencer is used the exhaust outlet measurement is taken at the exhaust outlet end of the silencer.
The minimum length of a silencer (if used) must be 60mm and the minimum volume must be 15 cm^3.

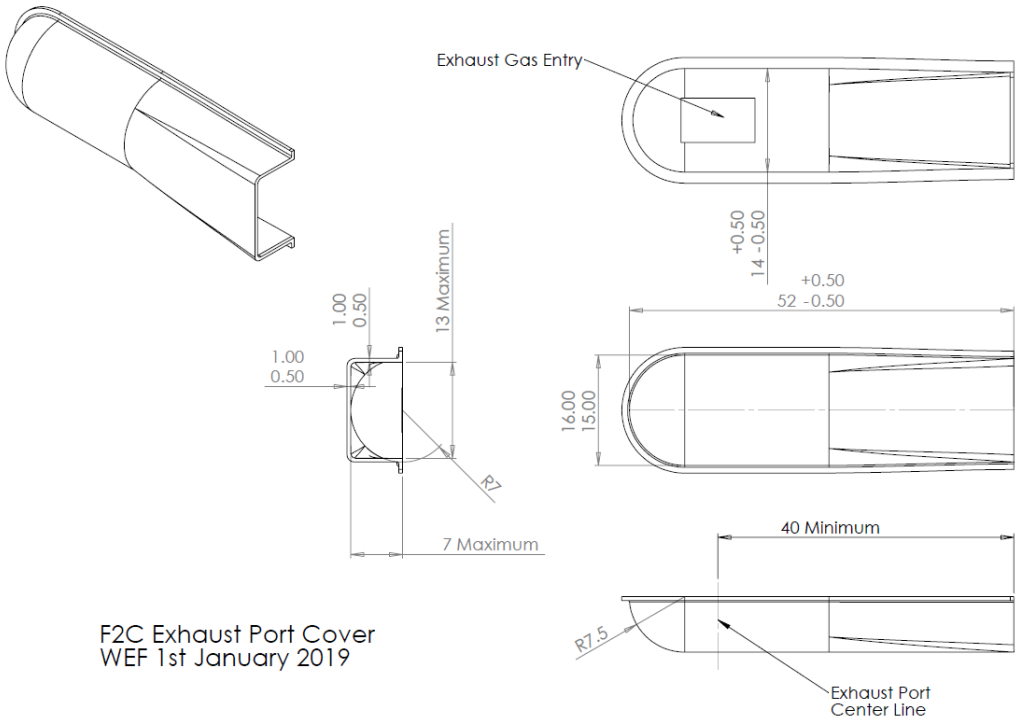
Note: If a silencer is used, then rule F2C.3.2 h) does not apply to this rule.

F2C.4.1. The model characteristic shall be:

a) A minimum total projected surface area of 12 dm^2.
b) A maximum model weight of 500 g, including engine, shut-off/fuel tank and propeller but without fuel.
c) The minimum dimensions of the model fuselage at the top of the cockpit shall be:
height = 100 mm
width = 50 mm
cross-sectional area = 39 cm^2
Wing fillets shall not be included in the fuselage cross-sectional area.
If an exhaust silencer system is partly recessed into the fuselage, then the fuselage cross-section shall be measured with an imaginary outline of the cross-section as if there was no cut out for the exhaust silencer system.
d) The presence of a cockpit or cabin with a clear or painted windshield.
e) The minimum diameter of wheels shall be 25 mm. The use of metal rimmed wheels is forbidden.
f) The maximum volume of fuel and oil permitted into a single tank is 7 cm^3.
g) The direction of model flight is anticlockwise.
h) The Engine must be entirely enclosed within the fuselage except for the necessary openings to allow for engine air induction, compression, fuel rate adjustment, fuel filler and overflow tubes and cylinder cooling air intake/outlet.
The engine may be visible through these openings. Compression, fuel rate controls and fuel filler and overflow tubes and silencer (if fitted) may extend outside the fuselage.

i) The engine exhaust must be entirely enclosed by an external cover, the outlet of which shall be on the pilot's side of the fuselage. The engine exhaust must be entirely enclosed, except for the external cover exit.
Entirely enclosed means: The cover should be sealed against the fuselage; exhaust waste should not exit the cover in any location other than the outlet.
   i) The engine exhaust port centre line shall be perpendicular to the crankshaft axis and piston centre line.
   ii) The exhaust gas must exit the crankcase along the centre line of the exhaust port. The gas must then turn through a minimum of 90 degrees begore exiting the cover.
   iii) The minimum distance between any part of the outlet window projected onto the crankshaft axis and the piston axis shall be 40 mm, measured along the crankshaft axis.
   iv) The maximum size of the exhaust cover outlet window shall be a 13 mm×7 mm rectangle, and it must lie on a single flat plane.
   v) The fuselage and exhaust cover sealed against it should create a closed volume with only three allowed openings:
      1. Exhaust outlet (13×7mm) within the exhaust cover and the side of the fuselage.
      2. Engine exhaust inlet within the fuselage.
      3. Exhaust cooling inlet (5×5mm) within the fuselage.
   vi) Any air inlet channel which leads to where the engine exhaust enters into the model shall have a maximum size of 5 mm×5 mm.
   vii) The engine shall not be visible from the exhaust outlet of the model aircraft.

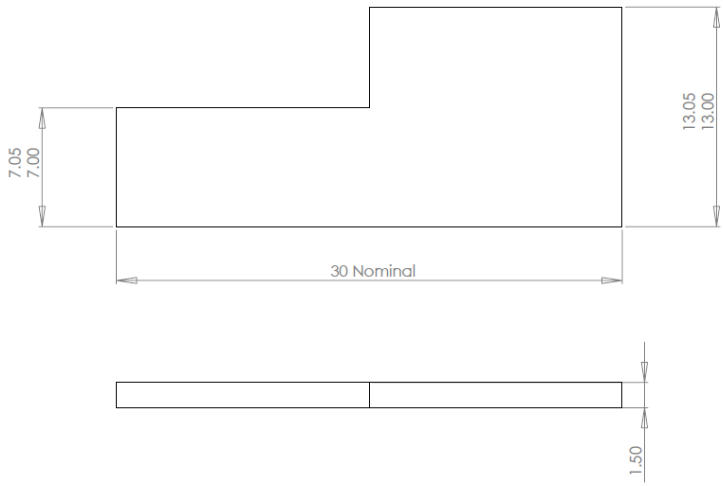
The above specifications can be seen in the drawing which follows, which is an example only of the



exhaust cover specification:

   viii) The exhaust outlet size shall be checked by no-go gauges: 13.05 mm×1.5 mm and 7.05 mm×1.5 mm.

See the following diagram:



Exhaust cover outlet gauge

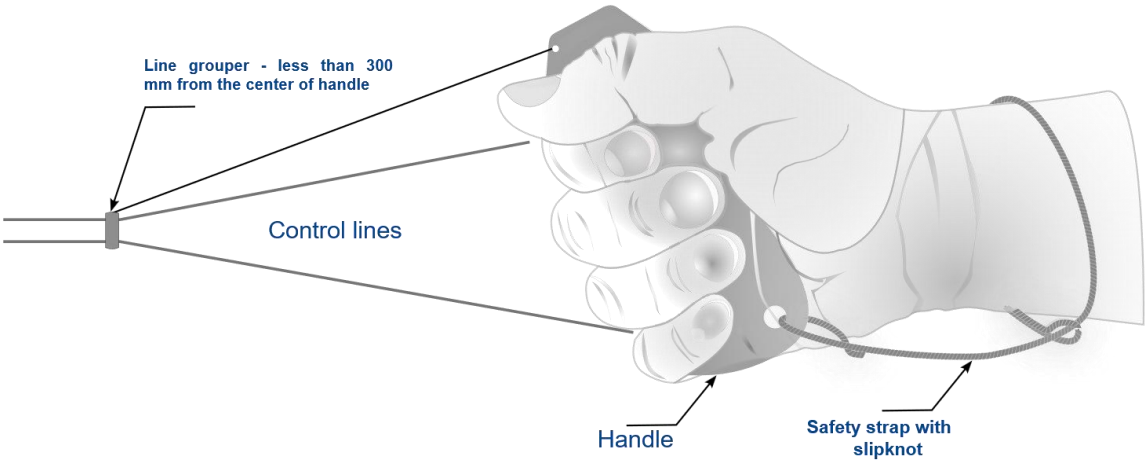
j) The landing gear shall permit normal take-off and landing. The only movement of the permanently extended leg that is allowed, is for shock absorption.

k) The fuel tank, tubing, and any associated filling/shut-off valves shall be accessible for accurate total volume measurement. A model will be disqualified if the organisers do not consider the system to be accessible or accurately measurable.

l) The model must be equipped with an effective pilot-actuated engine-stopping device.

m) The control system shall consist of two 0.35 mm diameter solid steel lines (minus tolerance of 0.011 mm allowed) or two 0.35 mm diameter stranded (minimum three equal diameter steel strands) lines (no minus tolerance allowed) connected to a pilot's control handle. The flying line length is 15.92 m (-0 mm/+25 mm tolerances allowed), measured from the centre of the control handle to the axis of the propeller.

n) A flexible 'line grouper' may be fixed to the wing at the point of exit of the flying line but may extend no more than 20 mm beyond the end of the wing. The control handle shall be constructed with the distance between the centre of the handle grip and the point of flying line flexibility no greater than 40 mm. Another 'line grouper' is permitted to link the lines together less than 300 mm from the centre of the control handle.



o) A safety strap connecting the competitor's wrist to the control handle must be provided by the Competitor and always worn while his model aircraft is flying. The strap should be as shown in the sketch i.e. it should be attached to the wrist with a loop and sliding knot so that if the handle

is released it will tighten itself securely around the wrist. The point of attachment at the handle is up to the discretion of the pilot.

F2C.4.2. The general model and engine requirement:

The model aircraft must remain complete as defined in the whole of paragraph F2C.3 throughout the full race.

A team's models and engines shall not be used by other competitors in the same event.

F2C.5 Technical Checks

All dimensional/visual characteristics (noted in paragraph F2C.3) of each model, engine and tank to be used in a contest shall be verified by the organisers with detail consideration noted below:

a) All fuel tanks shall have their capacities checked by an accurate visual examination of the volume of the fuel put into the tank and all connecting tubing and over-flow pipes. The check shall be made prior to the contest, after the final, and may be made after each race as determined by the organisers. The minimum reading accuracy of the checking system shall be 0.10 cm^3 and only two checks are permitted to prove compliance in the official processing period or at any subsequent checking.
b) The flying line length shall be measured before each race. A load sufficient to remove only the slack from the lines may be applied during the flying line length check.
c) Both flying lines shall be checked for diameter at three locations along the length of the lines, prior to each race, using an instrument which complies with the specification in paragraph 8.1 of the F2 Organiser's Guide.
d) The control system shall be checked for strength before each race by applying a tension load between the model and the control handle grip equal to a minimum of 30 times the weight of the model and a maximum of 140 N using an instrument with a maximum reading accuracy of 1.0 N. Before each race a separate test shall be made between the wrist strap and the control handle to the same standard.
e) Prior to each race the flying lines shall be checked to verify that there is no intentional twisting and/or linking of the two control lines from the point of exit of the model and a point 300 mm from the control handle.
f) The engine capacity and exhaust area shall be verified prior to the contest, after the final race, and may be checked after each race, as determined by the organisers.
g) If the engine has an integral head or extremely tight-fitting piston/liner assembly, the team must provide tooling to allow the crankshaft stroke to be measured accurately. Measuring instruments shall comply with the specifications in paragraph 8.1 of the F2 Organiser's Guide.

F2C.6 Organisation of Races

a) The three teams in each round of qualifying and semi-final races shall be determined by a blind draw. Contest organisers shall, where necessary, determine the mechanism that ensures that there is only one team of any nation in the same qualifying or semi-final race. Races with fewer than three teams will be put at the end of the draw, in order to allow a 3-team race with teams that have been granted a re-flight in that round.

b)

i.) When a qualifying race does not contain three teams per rule F2C.5.a), the judges shall ask for volunteers (from different nations in the case of World or Continental Championships) to allow the remaining race to start with three teams.
ii.) Teams shall have a maximum of 10 minutes after the judges call for volunteers to register their interest.
iii.) Teams that were either disqualified or did not fly in the current round are not permitted to volunteer.
iv.) Any volunteer team shall have its existing result in the current round cancelled and replaced by its later result.
v.) In order to fill the vacant places, the judges shall select the volunteer team(s) in descending order of their existing results in that round.
vi.) In the case where two or more volunteer teams have identical existing results then a blind draw shall take place to establish which volunteer team(s) fill the vacant places.

vii.) Volunteer and originally drawn teams shall be treated equally.
viii.) The Judges shall conduct a separate draw for the segment choice order.
ix.) If there are insufficient volunteers, the competing team(s) will be allowed to start the race with fewer than three teams to complete their qualifying or semi-final race.

c) Before entering the circle, teams may run their engines under the contest organiser's supervision so as not to interfere with the starting procedure of a race. Mechanics shall not walk with a running engine.
d) In the event of unsuitable weather conditions (such as strong winds, unacceptable air temperature, rain, or snow) that would lead to unacceptable sporting results (CIAM General Rule C.17.2 iv) the F2C Contest Director, or the Judges may postpone races or prematurely end the contest.

F2C.7 Race from Start to Finish

a) The teams enter the flying circle at the invitation of the Judges. One 'observer' or Team Manager may enter with each team to provide verbal assistance but shall not render any physical help to the mechanic during the race.
b) The teams select their pitting areas for qualifying and semi-final races in the order of the race draw. The chosen pitting areas are considered occupied until the race is finished, and teams are not permitted to change their selected pitting segment after the start of the warm-up period.
For the final race, the selection of the pitting areas shall be according to the times achieved in the semi-finals races with the lowest time choosing first. In the case of a tie, the teams' second-best semi-final results shall decide the order of choice.
c) The teams may not start their engines prior to the 90 seconds engine(s) warm-up period unless otherwise directed by the Circle Marshal.
d) The Circle Marshal signals (visually and orally) the start of the 90 seconds engine warm up period. A second signal (visual and oral) announces the end of the warming-up period, and the Circle Marshall orders the mechanics to stop engines.
e) The next 30 seconds are allowed for final preparations and the Circle Marshal announces the final ten seconds and then orally counts down the last five seconds to the start. For the last three seconds of the countdown, and at the starting signal, the mechanics must be standing erect, and the pilots must be crouching on the border of the centre circle (one foot outside the centre circle), with one hand touching the ground and with their control handles as close to the ground as defined by the Judges.
f) A "sharp" starting signal (visual and oral) must be given by the Circle Marshal to enable accurate timing.
g) The models must fly at a normal height, between two and three metres, except when overtaking, taking off or landing.
h) The correct piloting technique is to walk a circle at the centre of the 3 m centre circle with centre of this circle remaining at the extremity of the pilots' left shoulders except when allowing space for an overtaking pilot (Figure F2C.6.i).
i) The walking circle should be as small as possible, so that the controlling handle moves forward in the direction of the model and
   i. the pilot's handle is positioned in the centre line of the pilot's body. The handle is allowed to move vertically on this line as long as it does not move more than 30 cm out from the chest of the pilot nor be pulled back over the pilot's head in an attempt to shorten the radius of the model's path. (An exception is allowed for 3 laps when taking off, landing or overtaking), and

ii. the lines are perpendicular to the pilot's shoulders. When the pilot is positioned correctly the lines form a tangent to the pilots' walking circle (Figure F2C.6.i - overleaf) and

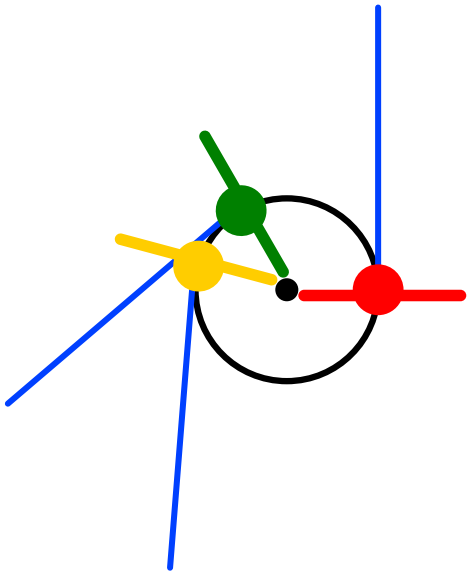


Figure 4.3.6.i

iii. the pilot must stand in an upright position. He must not lean backwards in an attempt to shorten the radius of the model's path or block an overtaking pilot and

iv. the pilot's nonflying arm should remain by his side or slightly forward. He should not hold or obstruct another pilot.

j) Overtaking must be carried out by over flying, with the model's altitude at a maximum height of 6 metres. The pilot being overtaken must not carry out any manoeuvre to impede the overtaking competitor or his model and must leave space for the overtaking pilot when the overtaking is finished.

k) The model is allowed to fly a maximum of two consecutive laps without the motor running.

l) Landings must take place with the centre line of the model inside the flight circle. A landing model has right-of-way priority over stationary or 'taking off' models.

m) The model must land, with its motor stopped, before the mechanic is allowed to catch it.

n) After the mechanic has caught the model, he must go to the nearest free pitting area from the point at which the model was stopped.

o) Prior to the start of the race and during pit stops, the pilot must be crouching at the edge of the centre circle with one hand on the ground, only one foot outside the centre circle and his handle and lines as close to the ground as defined by the judges. When the mechanic releases the model, the pilot must proceed toward the centre of the circle and merge with the other pilot still flying. At all other times the pilots must remain inside the centre circle.

p) During the re-fuelling and re-starting of the motor, the mechanic must keep the model in contact with the ground by at least one point and with the model's centre line outside the flight circle. If engine adjustments are necessary, the model is permitted to be off the ground by a maximum of 250 mm.

q) When a team has finished the race, is disqualified, or when it cannot otherwise continue, the pilot must sit down or crouch outside the centre circle as long as the other competitors are still engaged in the race, unless the Circle Marshal allows him to leave the circle earlier.

r) When a team cannot finish the race and its model is in a position where it may obstruct other teams, the pilot must immediately clear the model to a safe location.

s) The race is finished as defined in paragraph F2C.1.b).

F2C.8 Definitions of Official Flight and Re-flight

Any team in any race, that is not granted a re-flight, records an official flight.

Re-flights may be granted as follows:

In a qualifying or semi-final race when any team which suffers a significant time penalty through an act of obstruction or collision, for which that team was not responsible.

In a qualifying or semi-final race when only a single team is able to continue and before any team has completed 50 laps.

In a final race when one, or more teams, is unable to continue because of an obstruction or collision and before any team has completed 100 laps The final shall be stopped and all teams that have not been disqualified as a result of the obstruction or collision or prior to the stoppage.

When any team has its protest against disqualification upheld.

When any team retires from a drawn race prior to the start of the warm-up period.

A team that has been granted a re-flight is allowed to participate in another race.

F2C.9 Warnings and disqualifications

Warnings and disqualifications are given at the discretion of the Judges when infringements to the normal race procedure occur that involve safety, disadvantage, or advantage. Each warning or disqualification shall be notified both visually and orally to the team concerned.

F2C.9.1. A team may be warned if:

a) Either member of a team carries out a potentially dangerous action.
b) Either member of a team interrupts or obstructs another team.
c) Either member of a team carries out any action that unfairly improves their race time.

Typical examples of warning infringements are:

a) When a pilot interferes with or obstructs another pilot either by his conduct in the circle, or by a manoeuvre of his model preventing another model aircraft from flying or landing normally.
b) When a pilot, instead of walking around the centre, stands in the same place or walks backwards or continuously keeps the centre spot of the circle between him and his model.
c) When the pilot's flying style does not conform to F2C.6.i).
d) When a pilot applies physical effort to increase the speed of his model during the official flight.
e) When the height levels of -flight prescribed by the rules are exceeded.
f) When during the start of the race or during the pit stops, the pilot does not have one hand on the ground, or the control handle and the lines are not as close to the ground as defined by the judges.
g) When the pilot does not leave space in the centre circle for an overtaking pilot when the overtaking is finished.
h) When a mechanic:
   - services the model with its centre line inside the flight circle;
   - does not keep the model in contact with the ground by at least one point during normal servicing;
   - lifts the model higher than 250 mm above the ground during adjustment
i) When the mechanic is not standing erect at the start signal.

A penalty of 5 seconds shall be added to the race time of a team starting the engine before the start signal.

F2C.9.2. A team may be disqualified if:

a) Either member of a team carries out a dangerous action.
b) Either member of a team causes a collision or obstruction that ends another team's race.
c) The Team Manager or observer carries out any physical action that materially affects the race result.
d) For any other flagrant breach of the rules.

Other typical examples of disqualification infringements are:

a) When the pilot puts a foot outside the centre circle before the mechanic has taken hold of the landing model.
b) When the model lands outside of the flight circle. (Landing is defined as the first point of contact between the wheel and the ground)
c) When the centre line of the model is outside the flight circle before the mechanic has caught the model.
d) When the mechanic steps inside the flight circle line or reaches inside the safety circle line.
e) When the mechanic retrieves his model by any device.
f) When overtaking is carried out by passing under the slower model provided the slower model flying height complies with rule F2C.6.g.
g) When the pilot performs an extreme manoeuvre to overtake another model.
h) When jettisoning occurs or the model and other equipment is not in the condition as stated in F2C.3. throughout the race.
i) When the model flies more than two laps with the motor stopped.
j) When the model is recovered with the motor running or prior to touch down with the motor stopped.
k) When after its model has been processed, the competing team uses parts or elements not checked and registered to that team during the processing. If the team has modified its model by changing the characteristics or specifications imposed by the rules this may lead to the application of penalties as stated in the General Section of the Sporting Code.
l) When the mechanic does not act according to F2C.6.n.
m) When the team accumulates three warnings during a qualifying or semi-final race or four warnings in a final.

In the final race a penalty of 5 seconds shall be added to the race time of a team that has been given a third warning.

Note: When a team that has been disqualified and is instructed to land its model, the pilot must land the model within 10 laps. If the team continues to fly on and further interferes with the remaining teams the judges can recommend that the team be disqualified from the whole contest.

F2C.10 Team Qualification

a) The team race competition shall have either three rounds of qualifying races, two rounds of semi-final races, and a final race or four rounds of qualifying races and a final race. Each competing team must take part in at least one qualifying race to progress to either the semi-finals or final race.
b) The number of teams advancing to the semi-final races will depend upon the total number of teams entered in the competition, based on best single result.

Number of entered teams	Number of semi-finalists
2 to 8	0
9 to 11	6
12 to 39	9
40 or more	12

When semi-final races cannot be started with three teams, the numbers will be made up by advancing teams with the next best qualifying race times. Teams advanced to the semi-finals shall not be granted a re-flight, but any registered flight times shall be eligible for classification.

c) In the case of a tie amongst the teams advancing to the semi-final races, or the final race (when no semi-final races are run) the next best qualifying race times for the teams will be taken into

account, and so on, until the tie is broken. If after this, there is still a tie between some teams, new qualifying race(s) will be organised between these teams until the correct number of teams advance.

d) The teams who register the three best semi-final race times shall advance to the final race. When no semi-final races are run, the teams who register the three best qualifying race times shall advance to the final race. When fewer than three teams are either willing or able to take their place in the final, the number shall be made up by advancing the next best results from the semi-finals or qualifying flights as appropriate (this rule shall not apply where a final race is re-started with less than the three original teams).

e) A specific junior final will be flown if three or more junior teams have recorded a time in the qualifying races. The result of this junior final will be taken into account only for the specific junior classification and will not change the general placing.

F2C.11 Team Classification

a) Following a successful post-final race technical check in accordance with paragraph F2C.4.a) and g), the teams that participated in the final race shall be placed at the head of the classification, using their final race times. In the case of a tie in the final race, the tie break will be determined by descending order of best semi-final, second best semi-final, and best qualifying race and so on until the tie is broken. If more than one team is disqualified in the final race, those teams shall be classified in order based on number of legal laps completed.

Note: The judges' decision to disqualify must be communicated to the lap counters to record the number of "legal" laps.

b) Teams that participated in the semi-final races, but did not advance to the final race, shall be classified next in order of their single best semi-final race times.

c) Teams that did not advance to the semi-final races shall then be classified in order of their single best qualifying race times.

d) Teams that completed no qualifying race shall then be classified in order based on numbers of laps completed.

e) A disqualified team shall always be classified after any team that has retired without a disqualification.

F2C.12 National Team Classification

National team classification is established by adding the numerical classification position of each individual team. The national team with the lowest total is ranked first, etc with complete 3-team national teams ahead of 2-team national teams, etc. In case of a national team tie, the best individual team placing shall be used as a tie break. The defending champion's classification position shall not count toward a national team's classification unless he is part of the 3-team national team.

F2C.13 Timekeepers

Three timekeepers shall be assigned to each team in each race. They shall be positioned outside the flight circle, near the pitting area of the model which they are assigned to time. They are responsible for counting the laps of the model during the race and timing the race. They shall be equipped with mechanical lap counters and electronic stopwatches registering at least 1/100th second, with a minimum timing limit of 15 minutes. The stopwatches may be replaced or complemented by a computerised timing system of equal or better accuracy.

The time for the flight shall be calculated as defined below:

If all three watches record a time, a maximum tolerance of 0.18 seconds is allowed between the middle watch time and each of the two other watch times (lower and higher ones). If all recorded times are within the defined tolerance, the time for the flight shall be the average of the three watch times.

If one stopwatch differs from the closer of the other two by more than 0.18 seconds, then the average time shall be calculated from the other two watch times.

If both the lower and upper recorded times exceed the tolerance, the team shall be given the choice between having a re-flight or accepting the middle time as the time for the flight. Once the team has made its choice, the decision is irreversible.

If only two watches record a time and they are within the 0.18 second tolerance, the time for the flight shall be the average of the two watch times.

If only two watches have a time and they are not within the 0.18 second tolerance, the team shall be notified. The team may accept the higher of the two watch times or be granted a re-flight. Once the team has made its choice, the decision is irreversible.

If only one watch has a time, the team shall be notified. The team may accept the single time or be granted a re-flight. Once the team has made its choice, the decision is irreversible.

If all watches fail, there will be no recorded time, the team shall be notified and granted a re-flight.

The time retained will be made up to the next upper 1/10th second.

All decisions about timing must be reported to the F2C Chief Judge without delay.

F2C.14 F2C Panel of Judges

The contest organisers shall appoint three Judges, from the list of CIAM-approved judges proposed by the National Air Sport Controls. Each Judge shall have had proven proficiency and recent experience in international competition and judging at that contest's standard. The Judges shall have a working understanding of a common language.

At World and Continental Championships, and other limited entry international competitions, the Judges shall be of different nationalities.

In open international competitions, the Judges shall be of at least two nationalities and two of them shall be from the list of CIAM-approved judges.

The Judges are responsible for observing the conduct of each team during each race.

Notice of warnings and disqualification are given by loudspeaker announcement and coloured lights:

Green light	First warning (first offence)
Amber light	Second warning (renewal of the first offence or a new offence)
Red light	Third warning (renewal of previous offences or a new offence) and disqualification (in qualifying and semi-final races).

For the final only, a team shall be disqualified after a fourth offence, (renewal of previous offences or a new offence) by the judges verbally announcing:

"(Team Colour) - fourth offence, disqualified"!

In addition, a second set of lights, corresponding to the team colours, shall be provided. Upon the announcement of the fourth warning in a final race, the appropriate light for the disqualified team shall be displayed.

Note: The Team Race Judges' Guide is at Annex 4C.

CLASS F2D – CL COMBAT

F2D.1 Definition of a Combat Event

A combat event is a contest during which eliminating heats are followed by a final in which two competitors with their model aircraft fly in the same circle at the same moment for a predetermined time, the object being to cut a streamer attached on the longitudinal centre line of the opponent's model aircraft, points being awarded for each cut taken.

F2D.2 Definition of a Combat Model Aircraft

a) Model aircraft in which the propulsion energy is provided by a piston motor(s) and in which lift is obtained by aerodynamic forces acting on surfaces which remain fixed in flight, except for control surfaces.
b) The longitudinal centre line shall be defined as the axis of the propeller in case of a single engine model aircraft and the axis of symmetry in the case of multi-engine model aircraft.

F2D.3 Combat Site

A combat site must consist of three concentric circles which shall be marked on the ground.

a) The pilot circle: ..... radius 2 metres.
b) The flight circle: ..... radius 20 metres.
c) The pitting circle: ..... radius 22 metres.

The flight and pitting circles must be laid out on grass. The pilot circle may be laid out on grass or any other material. The area between the 20 and 22 metre circles is called the pitting area.

During active combat periods the pilot and his mechanic(s), officials, team managers and others within the boundary of the designated combat flying area must wear a safety helmet, with a fastened chinstrap, strong enough to withstand the impact of a flying combat model aircraft.

To avoid the catching of the opponent’s lines the protruding parts of the helmet must be covered.

F2D.4 Competitor

The pilot, who shall be the entrant and known as the competitor, may employ a maximum of two mechanics in any one heat. (In exceptional circumstances of wet or extremely windy weather, an additional helper may be used as a streamer holder and must perform no other function for the duration of that combat period).

For World and Continental Championships, the mechanics (helpers), a maximum of six other than team members or the team manager (or assistant team manager), must be registered for no more than one national team, from the beginning of the competition throughout to the end.

For Category 1 competitions F2D Mechanics must hold a valid sporting licence.

F2D.5 Mechanics for Category 1 Competitions

a) Each pilot may name a “mechanic”. For complete Teams (3 seniors with or without a junior) this may be a mechanic listed for the Team, or any pilot in the Team, or any other member of the National Team.
b) Incomplete Teams (1 or 2 pilots) may use a mechanic listed for the Team, or the other pilot (if any) or any other member of the National Team. They may also choose to use a mechanic from the “Mechanics Pool”.
   If no such person can be found, the pilot is entitled to use mechanics of other incomplete team(s), or any person holding a valid FAI License. However, F2D pilots competing at the respective event may not be chosen. To encourage F2D mechanics to register into the "mechanics pool” some incentives may be provided to them by the organizers.
c) Each named “mechanic” may only appear once in the list (i.e. he may not be listed for more than one pilot).
d) Before the contest mechanics of any nationality not listed for a Team may be listed in a “Mechanics Pool”. Mechanics from this pool may be used by any incomplete Team.

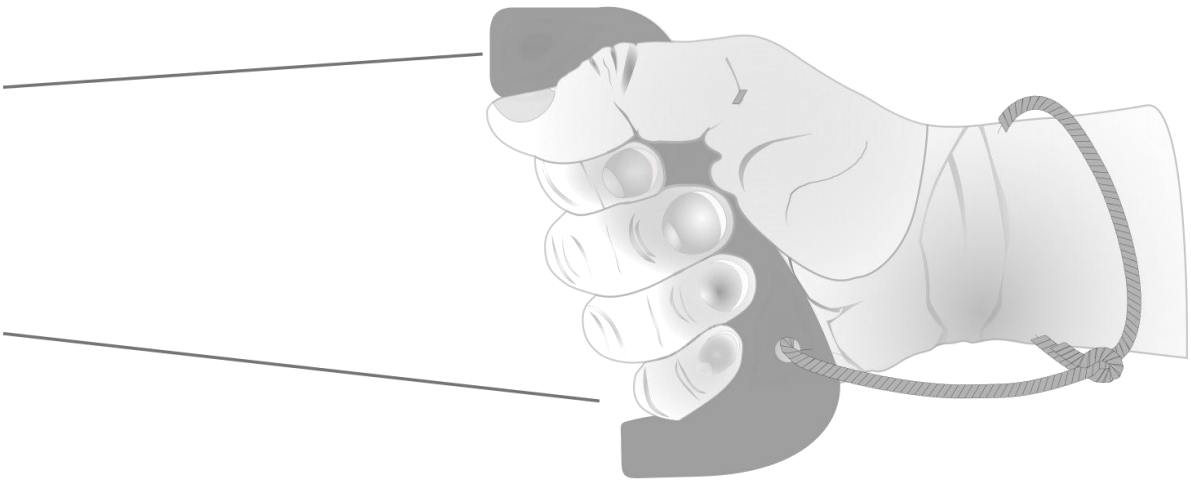
e) The results list will contain both the name of the pilot and his designated mechanic.
f) The designated mechanics of the individual pilots and national teams placed 1, 2 and 3 shall each receive an FAI Diploma presented on the podium.
g) All Mechanics listed must possess a Sporting Licence.

F2D.6 Characteristics

a) Maximum loading: ..... 100 g/dm^2
Maximum swept volume of motor(s): ..... 2.5 cm^3
b) Line length: .....15.92 +/- 0.04 m
Minimum line diameter: ..... 0.385 mm (no minus tolerance)

Two multi-strand control lines must be used. No free ends capable of entangling an opponent's lines, and no line splices, are permitted. Open connection connectors are not allowed.

c) Engines with glow plug ignition shall have their exhaust port(s) connected to silencer(s) (one or two), consisting of a simple chamber with one circular cross-section, rearmost outlet aperture of 6 mm diameter (1) or 4.2 mm diameter (2) opposing the exhaust port connection.
a) The minimum total volume of the exhaust system shall be 12.5 cm^3. In the case of two exhausts, each silencer shall have a minimum volume of 6 cm^3.
b) The maximum total length of the exhaust system from exhaust port(s) of the cylinder to and including outlet(s) is 15 cm. One pressure tap directly connected to the fuel tank, of 2 mm maximum diameter is allowed. No other openings or vents are allowed.
c) The motor shall be naturally aspirated via a single round venturi with a maximum effective diameter of 4 mm.
d) Any interconnecting chamber between the air intake and the induction port of the motor shall have a maximum volume of 1.75 cm^3. This clearly prohibits sub-piston induction for supplementary air intake.
e) A safety wire with a minimum diameter of 0.5 mm must be attached between the control system and the engine(s). The engine(s) must always stay connected to the lines.
f) A safety strap connecting the competitor's wrist to the control handle must be provided by the competitor and worn at all times while his model aircraft is flying. The strap should be as shown in the sketch i.e. it should be attached to the wrist with a loop and sliding knot so that if the handle is released it will tighten itself securely around the wrist. The point of attachment at the handle is up to the discretion of the pilot.



Handle and safety strap

g) The model aircraft shall not carry any artificial aid to assist the cutting of the streamers.
h) The model aircraft shall be equipped with a device (referred to as the “streamer hook”), specially designed to retain the streamer which shall be fitted on the longitudinal centre line and sufficiently strong so that the streamer does not become detached under normal flying conditions.
i) Standard fuel for glow ignition engines shall be 80% methanol, 5% nitromethane and 15% oil. The oil may be castor oil, synthetic oil or a mixture of both. Fuel shall be mixed by volume. The

standard fuel shall be supplied by the organisers for all Category 1 events. The organiser must specify in Bulletin 1 which type of oil (castor or synthetic or a mix of both) will be used in the fuel.

Note: Fuel for compression ignition engines is not restricted.

j) Each model aircraft must be equipped with an engine shut-off device that stops the engine automatically if a fly-away occurs. The shut-off can be inactive at take-off, as long as it becomes active before combat starts. Once active, the device must remain functional for the entire time the model aircraft remains airborne. The device may only be used to stop the engine.

Note: CIAM General Rule B.1.2.2 does not apply to engine-stop devices in class F2D as the device may be electronic and controlled via the lines or wireless.

F2D.7 Technical Verification

To be tested before each heat:

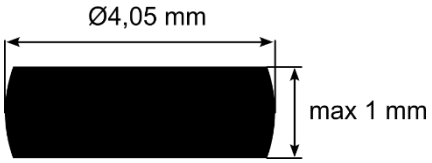
a) Each set of lines must be checked for length and diameter.

The line length is measured from the inboard face of the grip of control handle to the longitudinal centre line of the model aircraft.

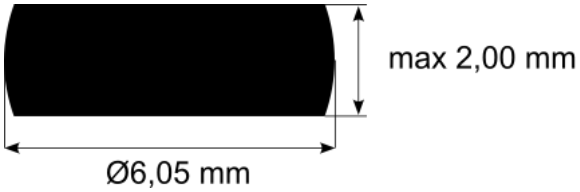
A pull test shall be applied to the assembled handle(s), control lines and model aircraft. The pull test shall be equal to 20 kgf.

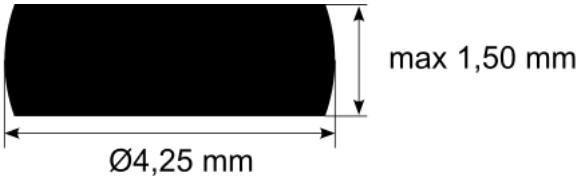
The processing officials or judges may ask the competitor to change the lines if there is any doubt about the line quality, such as kinks, curls, stress or rubbing marks.

b) The intake opening shall be checked with a simple plug gauge (diameter 4.05 mm) per the following sketch:



c) The outlet of the silencer(s) shall be checked with a simple plug gauge (diameter 6.05 mm for one silencer and 4.25 mm for two silencers) per the following sketch:





d) Demonstration of the engine shut-off device may be required by the judges before each heat.

Additional demonstrations may be requested by the judges after the heat.

e) The safety strap(s) and safety wire(s) may be pull tested with a load equal to 20 kgf.

F2D.8 Number of Model Aircraft

a) Only one model aircraft specification certificate is required for each design of model aircraft presented by each competitor.

b) Each competitor shall be permitted a maximum of two model aircraft, two handles, two pairs o lines and two engines in each combat heat. If the reserve model aircraft is used, the streamer or its remaining parts must be transferred to the reserve model aircraft. The handle plus lines for the reserve model aircraft must be placed just outside the pilot circle.

c) Engines, control lines or handles may not be replaced or interchanged during the combat period.

F2D.9 Streamer

The streamer shall consist of double weight crepe paper (80 g/m^2) or any replacement of equivalent strength, not less than 3 m nor more than 3,5 m long and 3 +/- 0.5 cm wide, fixed to a sisal (or any replacement of equivalent strength) string of 2,75 m minimum length.

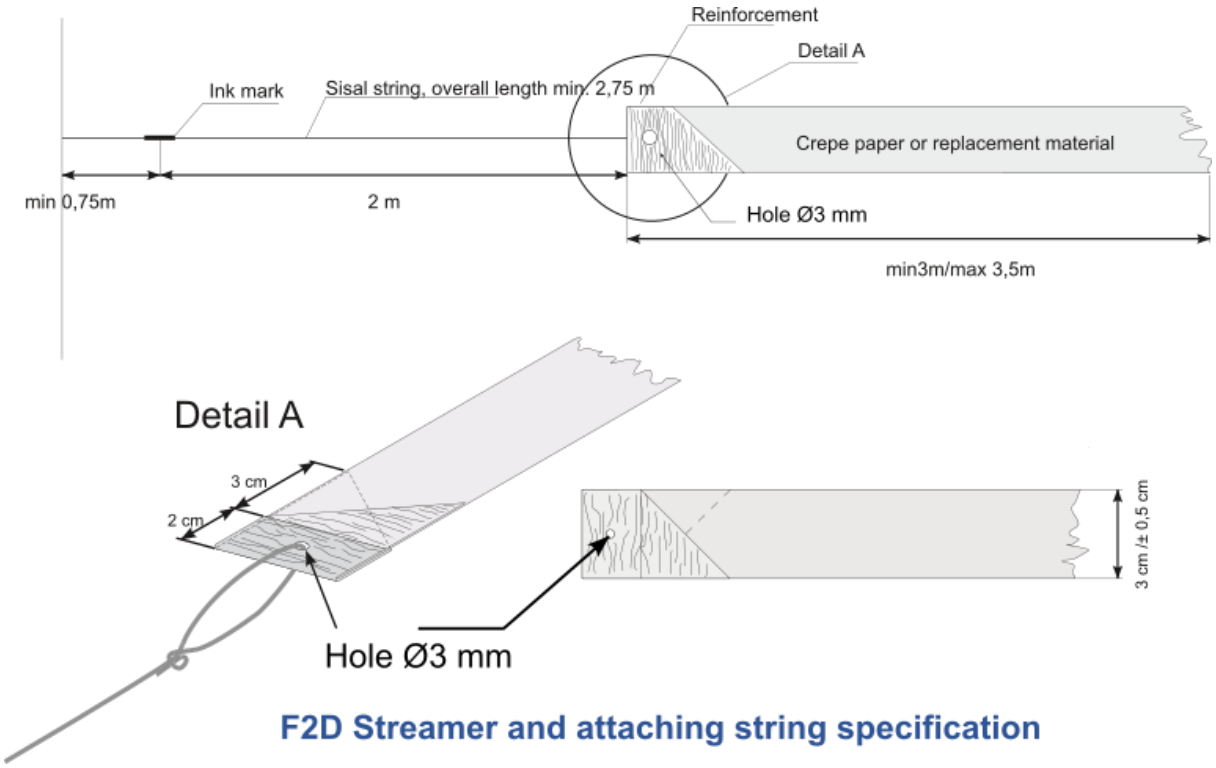
All streamers must be of the same length.

There shall be a clearly visible ink mark 2 m from the junction of the string and streamer.

The streamer shall be attached to the model aircraft in such a way that the ink mark is level with, or behind, the rearmost portion of the model aircraft (see sketch). The attachment part of the string shall have a minimum length of 0,75 m.

The attachment end of the streamer shall be reinforced on either side by tape approximately 2 cm wide affixed diagonally to the length of the streamer with one at right angles to the other and extending for a maximum of 5 cm. An additional fibre/fabric reinforced tape 2 cm wide is affixed across the streamer.

The colour of the streamer must be different for the two competitors in the heat. Each pilot/pit crew shall be issued with a streamer at the start of the heat by the judge assigned to that competitor. A second streamer will be available from this judge when needed (*see the sketch overleaf*)



F2D Streamer and attaching string specification

F2D.10 The Heat from Start to Finish

a) All signals shall be both acoustic and visual.
b) During the starting period the launching positions must be separated by at least a quarter of a lap. The first named competitor in the draw shall have the choice of streamer colour and the other the choice of starting position.
c) It is the responsibility of the pilot/mechanics to make sure the streamer is unrolled before take-off
d) The motor(s) must be started by flicking the propeller by hand.
e) A first signal, given by the Official Timer, shall signify the beginning of the 30 seconds period when the mechanic(s) or the pilot have the opportunity to start, run and adjust their motors.

f) A second signal, given by the Official Timer, shall signify the beginning of the combat heat period on or after which the model aircraft may be launched.

g) From the moment the Official Timer has given the signal to launch, the combat heat lasts for a maximum of 4 minutes.

h) When the Circle Marshal is satisfied that each model aircraft has completed two level laps, anticlockwise, separated by approximately half a lap, he will give a signal that combat may begin.

i) Following an interruption when one or both model aircraft have been grounded, combat may restart after a signal from the Circle Marshal. This signal shall be given as soon as the Circle Marshal is satisfied that there is approximately half a lap separation between the two model aircraft.

j) If, after a mid-air collision, no streamer can be found and the streamer retaining device is missing or bent, then, with the permission of the judges, it is acceptable to continue the heat without replacing the streamer.

k) Only the streamer/string may be moved around the circle by the mechanics/pilot. Models in the pitting area may not be moved, other than to maintain a safe distance of approximately 5 metres from the opponent's mechanics. Under conditions of heavy wind, the Judges can allow models with a non-running engine to be moved to a safer starting position.

l) When moving around the circle the mechanics/pilots must be on the outside of the pitting circle. Within the flight circle, mechanics may only move radially inward and outward. Within a pit crew/team's pitting area they are free to move around and also to choose where to enter and step out of the pitting circle.

m) If, as a result of a mid-air collision, the silencer is detached and the model aircraft remains airborne, the heat may continue. After a landing, however, the silencer must be replaced before the model aircraft can be used again.

n) The Circle Marshal will monitor the conduct of both pilots and shall issue a yellow card warning to any pilot who uses a rough or unsafe flying style, causes line tangles, or displays unsportsmanlike behaviour. Each yellow card issued (a maximum of three for each pilot, per competition) shall be officially recorded and retained for the remainder of the competition. Initial and subsequent offences during a competition are to be penalised in accordance with 4.4.13A and 4.4.13C, respectively. If the first yellow card incident is considered severe, the pilot shall also be disqualified for the offence.

Note: Yellow cards are cumulative throughout the competition:

1st yellow card=	40 points penalty or disqualification from the heat for a more serious offence
2nd yellow card=	disqualification from the heat
3rd yellow card=	disqualification from the heat

o) The Circle Marshal shall give an acoustic signal to terminate the combat heat:
   i) 4 minutes after the signal to launch (10 seconds countdown).
   ii) If both streamer strings have been cut and the pilots have been asked to fly level and anticlockwise, and to cease combat (10 seconds countdown).
   iii) If one pilot has only the string remaining and requests to cease combat the Circle Marshal should instruct both pilots to fly level and anticlockwise (10 seconds countdown).
   iv) If the heat has to be terminated due to disqualification of one or both competitors or for any other reason.

The pilot(s) must stop their motor(s) and land after the heat is terminated.

p) In the case of a fly away (where the shut-off works), the mechanic can choose to leave the model where it landed and just collect the streamer.

F2D.11 Scoring

a) Scoring shall start at the signal to launch and continue during the heat (maximum 4 minutes).

b) 100 points shall be awarded for each distinct cut of the opponent's streamer. There is a cut each time the model aircraft, propeller or lines etc fly through the opponent's streamer resulting in particle(s) becoming detached from the streamer. A cut that contains only string does not count.

c) Two points shall be awarded for each second that a model aircraft is airborne during the heat.
d) Each penalty point given (See 4.4.13) shall be subtracted from the competitor's score.
e) In the event of a tie score in any heat, that heat shall be re-flown. A heat is considered a tie if the score difference is 10 points or less.

F2D.12 Re-flights

A re-flight may be granted:

a) In the event of a line tangle and only one model aircraft being grounded, making it impossible to clear the line tangle.
b) If, as a result of combat, a model aircraft cuts its own streamer/string, or the streamer/string becomes wrapped around the model aircraft and/or the lines (unless only string remains).
c) At the discretion of the Judges/Circle Marshal if an unfair or unsafe situation occurs and none of the pilots/mechanics can be blamed.

If flying, the pilot(s) must stop their motor(s) and land after the decision of a re-flight.

F2D.13 Penalties and Disqualifications

A. A competitor will receive a penalty of 40 points:

a) If he steps outside the pilot circle with one foot while his model aircraft is airborne.
b) If the mechanics enter the flying circle at an oblique angle or cut across the flying circle to reach a downed model aircraft or run around the circle within the pitting area, one penalty only will be given for each offence even if more than one mechanic is involved.
c) If the mechanic(s)/pilot do not immediately, or after a clearing a line tangle, withdraw a grounded model aircraft to the pitting area prior to servicing it. It is not allowed to service the model or remove the streamer until any line tangle is cleared.
d) If the model aircraft is launched prior to the starting signal.
e) If the mechanic(s)/pilot allows both engines to be running at the same time during the flight period.
Brief bursts, not longer than 10 seconds to warm the engine with a prime or to clear a flood is permitted. Running the engine from the tank is not permitted.
f) When he receives his first yellow card (Subject to 4.4.10.n.).

B. A competitor will receive a penalty of 100 points:

a) If the streamer does not cleanly unfurl upon launching the model aircraft.
b) If the mechanic(s) damage the streamer or allow the model aircraft to cut its own streamer whilst still on the ground and launch the model without replacing the streamer.
c) If the string (with or without the streamer) becomes detached from the model aircraft while airborne but not as the result of a mid-air collision.
d) If the silencer falls off during the flight or ceases to operate.

In all these cases the pilot, on a signal from a Judge, must immediately land. In case of a., b., or c., the streamer must be unfurled or replaced.

The watches should be stopped at same moment the model lands. The Judges will measure and deduct the time between the decision to land, and when the model has landed.

C. A competitor will be disqualified from the heat:

a) If he flies with a model that does not conform to 4.4.6.
b) If his model aircraft fails to become airborne within two minutes of the signal to launch.
c) If he attempts to fly a model aircraft which at the time of launch does not have a:
i) strong effective control mechanism,
ii) secure engine attachment
d) If he deliberately attacks the streamer of his opponent's model aircraft prior to the Circle Marshal's signal to start combat.
e) If he interferes with his opponent or forces his opponent to leave the pilot circle.
f) If, while his model is not airborne and his opponent is flying or ready to fly, he leaves any parts of his model or lines in the pilot circle without an immediate attempt to clear them.

g) If he attacks his opponent's streamer without his own, or the remaining parts, attached to his model aircraft (Except for 4.4.10.j).
h) If he is not present at his allotted flight time unless he has the express permission of the Event Director.
i) If he steps out of the pilot circle with both feet while his model aircraft is flying.
j) If he leaves the pilot circle without informing his opponent of his intention to do so when his model aircraft is grounded for a purpose other than to pick up the lines of the reserve model aircraft or to allow his model aircraft to be serviced.
k) If he flies in such a manner as to inhibit his opponent, or his opponent's pit crew, from clearing any line tangle.
l) If he flies other than level in an anticlockwise direction when only his model aircraft is airborne and there is no line tangle. Sudden or rough manoeuvres are not allowed.
m) If he fails to clear any line tangle prior to launching his reserve model aircraft unless both he and his opponent have informed the Circle Marshal that they have agreed to continue the heat without clearing the line tangle. In this event the Circle Marshal must agree to the continuation, only doing so when he is satisfied that it is safe to continue.
n) If he releases the handle and the safety strap separates from the handle or wrist or removes the safety strap, for any reason, while the model aircraft is flying.
o) If he interferes to cause a ground hit of, or collides with, his opponent's model aircraft that clearly has no streamer left and flies level in anticlockwise direction without any manoeuvres to chase and attack.
p) If his mechanic(s) enters the flying circle while both models are flying, or during a line tangle where at least one of the models remains airborne, or when a model is flying without the control of the pilot.
q) If a mechanic jumps over the opponent’s model aircraft and lines kept within the pitting area.
r) If, in the event of a flyaway, his engine shut-off device does not activate.
s) When he receives his second or third yellow card.
t) For any other flagrant breach of the rules.

F2D.14 The use of Video equipment

The Organiser/Judges may use video recording equipment to monitor the pilots and the pilot circle.

At the discretion of the Judges/Circle Marshal the officially recorded video can be used as a judging tool.

F2D.15 Individual and Team Classification

a) The contest shall be run as a knockout tournament.
b) The competitor who obtains the highest score in points shall be the winner of each heat.
c) A competitor shall be eliminated from the competition when he has lost two heats.
d) A round that includes a non-flying competitor from a previous round shall be drawn in one phase with the non-flying competitor from the previous round flying as first pilot in heat 1 and also first pilot in the last heat (if the number of competitors permit it and he is still in the contest). If he cannot fly in the last heat due to the number of competitors, he will fly first and last in the next round and so on until he has caught up.
e) Previous opponents and competitors of the same nationality shall be drawn apart if possible, with competitors of the same nationality to fly against each other only if there are no remaining opponents.
Defending champions, not members of their national team, are considered as individuals not possessing any specific nationality.
f) In a round with an odd number of competitors the non-flying competitor will fly twice in the following round, in the first heat and in the last heat (if the number of competitors permit it and he is still in the contest).
g) Each competitor shall be ranked according to his number of wins, not counting fly-off heats, with the fly-off heats being used to establish second and third place as necessary.

h) In the event of a tie for second or third place, the equal placed flyers shall take part in a fly off, during which they shall be allowed only one loss. In the event of a tie for third place after a fly-off for second place then there shall be a new fly-off for third place.

The pilots taking part in a fly-off are of equal status and must be treated as such.

It has no bearing in a fly-off if the pilots have met earlier in the competition or if they are of the same nationality or team.

i) A specific junior final tournament will be organised if juniors are at the same placing (tie) in the general tournament, in order to define who is first, second and third for the specific individual placing and will have no influence on the general individual placing (no change in the team classification).
j) The competitors' "win" scores, not counting fly-offs, shall be added for the participants of each nation.
k) The team classification is established by taking the total scores, obtained in 4.4.15.g) above, of the three best scoring members of the team and adding them together. In the case of a team tie for any of the top three places, the team with the lower sum of place numbers, given in order from the top, wins. If still equal, the best individual placing decides. Complete three-competitor teams are ranked ahead of two- competitor teams which, in turn, are ranked ahead of single competitor entries.

F2D.16 Judges and Timekeepers

a) The organisers shall appoint a panel of three judges who shall be selected from a list of persons proposed by National Airsport Controls for their proficiency and experience and approved by the CIAM. The judges must have at least one language in common. At World and Continental Championships and other limited entry international competitions, the judges must be of different nationalities. In open international competitions the judges must be of at least two nationalities and only two of them must be approved by CIAM. At World Cup and other Open International Competitions one of the judges and the Circle Marshal can be the same person.
b) Three timekeepers/scorers shall be allocated to each competitor for World and Continental Championships, two for Open Internationals.

F2G F2G CLASS F2G – CL ELECTRIC SPEED

Rule B.3.1.a) of Section 4B does not apply to class F2G

F2G.1 Definition of an Electric Speed Model Aircraft

Model aircraft in which the power is provided by an electric motor and in which lift is obtained by aerodynamic forces acting on the supporting surfaces, which except for control surfaces remain fixed in flight.

F2G.2 Characteristics of a Speed Model Aircraft driven by electric motor(s)

a) The power source shall consist of any kind of rechargeable batteries (or secondary cells), the maximum no load voltage **must not exceed 26 Volts** (max. tolerance +0.2 Volts).
In case the voltage is measured, this shall be done at the moment the preparation time for the pilot starts. After the measurement has been taken, the pilot is allowed 10 minutes preparation time before he is called to the start. If the model aircraft carries more than the allowed number of cells as power source for the motor or the voltage exceeds this voltage, the competitor is disqualified from that flight.

b) Battery type: any type of battery with a maximum of 6 cells in series.
Cells in parallel are not permitted. The maximum weight of the battery pack is 200 g. The weight of the battery pack includes soldering, insulation, cables and connectors. Mechanical or chemical modification of the individual cells, e.g. to reduce their weight, is not allowed except that insulation sleeves of individual cells may be changed.

c) Minimum total projected area ..... 5.0 dm^2

d) Maximum model weight with battery 600g

e) Maximum wingspan ..... 100 cm.

Note: To determine the wingspan of an asymmetric model aircraft, refer to CIAM General Rules B.4.27 and regard one point being at the thrust line of the aircraft.

f) The model aircraft must take-off from the ground.

g) For safety reasons a radio control system as defined by CIAM General Rules B.1.2.2 c) may be used to control the start of the motor, in-flight power and the shutdown of the motor. The system may be operated by the pilot or an assigned mechanic/helper.

h) After shutdown the aircraft must be retained until its power system has been secured against accidental motor start.

i) An external manually operated device to disconnect the battery must be fitted to enable total shut-off of the power when the model aircraft is not airborne.

j) The pilot or a helper must connect the motor power battery to the ESC whilst preparing the model for flight inside the flying circle.

Safety Note: Whenever the battery is connected to the ESC the model aircraft must be either retained or the pilot must hold the handle in the centre of the flying circle.

F2G.3 Diameter of Control Lines

a) Only two-line control is allowed, minimum control line diameter is 0.45 mm with a tolerance of minus 0.011 mm.

b) The lines must be round in cross-section and may not have any liquid or coating material applied. Solvent may be used for cleaning purposes only.

c) No intentional twisting and/or linking of the two lines together shall be permitted from the point of exit of the model aircraft to the control handle. The lines shall be separated by at least 5 mm at the point of exit from the model aircraft and at least 25 mm at the handle.

F2G.4 Length of Course

a) The measured distance covered by the model aircraft must be at least one kilometre.

b) The radius of the flight circle must be 17.69 m (9 laps = 1 km).

F2G.4.1. Line Tests

a) A line test shall be made before each attempt for an official flight.

b) The radius is measured from the axis of the pivot on the pylon, to the axis of the propeller. Where two propellers are employed, the axis of symmetry is taken as the reference for measurement.
c) A load sufficient only to remove the slack from the lines shall be applied during the line length check.
d) A load test shall be applied to the assembled control handle, lines and model aircraft equal to 50 times the weight of the model aircraft and this test shall be applied separately to the safety strap.
e) In each case the pull shall be applied three (3) times, slowly increasing to maximum load and releasing rapidly. The pull test should be made on the handle grip, not near the point of attachment of the lines (see sketch in rule 4.1.7).
f) The diameter of the lines shall be checked at random distances on at least three points along the length of each line.
g) A safety strap connecting the competitor's wrist to the control handle must be provided by the competitor and used during all flights.

F2G.4.2. Control Handle and Pylon Fork

See F2A rule 4.1.7

F2G.5 Definition of an Attempt

It is considered an attempt when the pilot does not engage the control handle in the pylon fork within 3 minutes after the starting signal. It is also considered an attempt if the electric motor does not start within 3 minutes from the starting signal.

a) For electric speed model aircraft, the starting sequence (signal) begins when the battery is connected to the ESC.

F2G.6 Number of Attempts

In the case of an unsuccessful first attempt for an official flight, the competitor is entitled to a second attempt. In accordance with the pilot, second attempts shall be scheduled to take place within the shortest possible time needed to re-establish flight condition.

F2G.7 Definition of an Official Flight

The flight is official when timing commences.

F2G.8 Number of Flights

Each competitor is entitled to three official flights.

F2G.9 Helpers

Two helpers are admitted to the contest area

F2G.10 Starting of Timing

The timing commences officially when the competitor has placed his handle in the pylon fork and the model aircraft having made 2 complete circuits again passes the electronic sensor or the height marker on the edge of the circuit directly opposite the timekeepers.

F2G.11 Height of Flight

During the timing of an official flight, the flying height must not be less than one metre and not more than 3 metres.

F2G.12 Cancellation of the Flight

A flight is cancelled when:

a) Any physical effort for the purpose of increasing the speed of the model aircraft during an official flight is applied by the pilot.
b) If at any time during the speed course the model aircraft exceeds a height of 6 metres or sustains a height in excess of 3 metres or less than one metre for more than one lap.
c) Continuous contact is not maintained with the pylon fork during the official flight.
d) Jettisoning occurs during the official flight.

F2G.13 Number of Timekeepers and Judges

a) The time shall be taken by either three timing officials equipped with 1/100-second resolution digital stopwatches or by an optical electronic system with equal or better resolution and accuracy. The optical system backup may be by some other electronic device or by two manual timekeepers.
b) Speed judges, at least two in number, shall be responsible for observing the conduct of the pilot and the altitude of the flight.

F2G.14 Timing

a) The individual times recorded by each timing official and/or by an optical electronic system shall be recorded in writing and retained by the senior judge or other official.
b) Replacement attempts shall be scheduled to take place within one hour of the original attempt.

Manual Timekeeping

i) The mean time of the three stopwatches shall be taken to calculate the result.
ii) In the case where one stopwatch differs from the closer of the other two by more than 12/100 seconds, or the official reports that he made a mistake, then the mean time shall be calculated from the other two stopwatch times.
iii) In the case where two stopwatch times differ by more than 12/100 seconds from the middle one, or two officials report that they made mistakes, then this must immediately be reported to the competitor or his team manager. The competitor then has the choice of using only the remaining stopwatch time to calculate his result, or he may take a replacement attempt.
iv) His decision must be given to the F2A Circle Marshall without delay, and is irrevocable.
v) No rounding off of decimals shall be made when calculating the mean time. The time thus obtained for calculating the speed shall be recorded and retained.
vi) The speed in km/h shall be calculated by dividing 3600 by the time according to a), and then taken to the nearest lower 1/10 km/h.

Electronic Timing with Manual Backup

i) The recorded speed in km/h is to be taken from the Electronic Official Speed (E Result) column for the TransiTrace system) of the electronic system for the result.
ii) The senior Speed judge shall check the result by looking at the logged individual lap times of the official flight, as well as the laps before and after the official flight.
iii) In the case where the electronic system does not return a clear time and speed then the mean of the two backup stopwatches shall be used to calculate the result.
iv) In the case where the two backup stopwatches differ from each other by more than 12/100 seconds, then this must immediately be reported to the competitor or his team manager. The competitor then has the choice of using the slower stopwatch time to calculate his result or may take a replacement attempt. His decision must be given to the F2A Circle Marshall without delay and is irrevocable.

Electronic Timing with Electronic Backup

(Primary & Secondary Systems)

i) The recorded speed in km/h is to be taken from the Electronic Official Speed (E Result) column for the TransiTrace system) of the primary system for the result.
ii) In the case where the primary system does not return a clear time and speed, then the recorded speed in km/h shall be taken from the Electronic Official Speed (E Result) column for the TransiTrace system) of the secondary system for the result.
iii) In the case where the primary and secondary systems both fail to return a clear time and speed, then the competitor shall be given a replacement attempt.

F2G.15 Individual Classification

a) The best speed attained during the three flights is used for classification. In case of a tie, to separate the fliers, the second-best speed, and if still a tie, the third best speed is used.
b) The first three positions are subject to rechecking of the declared model aircraft characteristics.
c) The weight of the models shall be randomly checked throughout the competition at the end of a competitor's flight.