

- ANNEX 4F -

**CLASS F2E - COMBAT MODELS WITH COMPRESSION
IGNITION ENGINES**

4F.1. Definition of a Combat Event

A combat event is a contest during which eliminating heats are followed by a final in which two models are flown at the same time in the same circle for a pre-determined time, the object being to cut a streamer attached on the longitudinal centre line of the opponent's model, points being awarded for each cut taken.

4F.2. Definitions

- a) A combat model is a model aeroplane in which the propulsion energy is provided by a piston motor and in which lift is generated by aerodynamic forces acting on supporting surfaces which must remain fixed (except for control surfaces) during flight.
- b) The longitudinal centre line shall be defined as the axis of the propeller.

4F.3. Combat Site

A combat site must consist of two concentric circles which shall be marked on the ground:

- a) The flight circle: radius 20 m.
- b) The centre piloting circle: radius 2 m.

The flight circle must be laid out on grass, the centre piloting circle may be laid out on grass or on any other material having a maximum radius of 4 m.

4F.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). The helpers (a maximum of six) other than team members or the team manager, must be registered for no more than one national team, from the beginning of the competition through to the close. During active combat periods the mechanics must wear protective head-gear fitted with an effective retaining strap and must also wear an effective form of ear protection.

4F.5. Characteristics of Combat Model

- a) Maximum surface area: 150 dm²
- b) Maximum weight: 5 kg
- c) Maximum loading: 100 g/dm²
- d) Motor: Compression ignition
- e) Maximum swept volume of motor: 2,5 cm³
- f) The motor shall have a maximum venturi diameter of 3,5 mm. (see 4.E.6.d. for technical verification). A safety wire with a minimum diameter of 0,5 mm must be attached between the bellcrank bolt (axle) and the engine so as to withstand a pull load of 105 ± 5 Newtons.
- g) The motor must run on a suction fuel feed only, with the fuel tank mounted such that the entire fuel tank is outboard of the longitudinal centre line.
- h) The propeller must be of 190 mm minimum diameter and 150 mm minimum pitch from a blade radius of 40 mm to the tip and constructed from a thermoplastic material (glass filling is permissible).
- i) The model shall not carry any artificial aid intended to assist the cutting of the streamers. The model shall be equipped with a device specially designed to retain the streamer which shall be fitted on the longitudinal centre line and sufficiently strong so that the streamer shall not become detached under normal flying conditions.
- j) Fuel is not restricted.

4F.6. Controls - Technical Verification

- a) Line Length: The length of the control lines must be 15,92 +/- 0,04 metres measured from the inboard face of the grip of the control handle to the longitudinal centre line of the model.

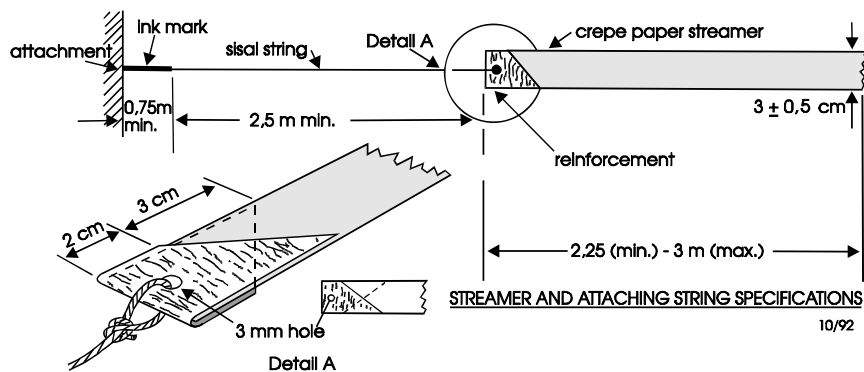
- b) Control System: Two multi-strand control lines of a minimum diameter of 0,385 mm (no minus tolerance) must be used. No free ends capable of entangling the opponent's line and no line splices, shall be permitted. A safety strap connecting the competitor's wrist to the control handle must be provided by the competitor.
- c) Line Tests: Before each heat any sets of lines which may be used must be checked for length and diameter. A pull test shall be applied to the assembled handle, control lines and model. The pull test shall be equal to 150 Newtons.
- d) The motor shall be naturally aspirated via a single round intake bore which will not admit a 3,55 mm diameter plug gauge. Any interconnecting chamber between the air intake and the induction port of the motor shall have a maximum volume of 1,75 cm³. This clearly prohibits sub-piston induction. Any venturi insert designed to accomplish this must be positively retained so that it may not become accidentally dislodged during the heat.

4F.7. Number of Models

- a) A competitor may have processed a maximum number of models equal to the number of heats a competitor may have to fly (excluding re-flights).
- b) Only one processing certificate is required for each design of model presented by each competitor.
- c) Neither the motor, control lines nor handle shall be replaced during the combat period. One model per match shall be allowed.

4F.8. Streamer

- a) The streamer shall consist of double weight crepe paper (80 g/m²) or any replacement of equivalent strength, not less than 2,25 m or more than 3,00 m long and 3,00 ± 0,5 cm wide, fixed to a sisal string of 3,00 m minimum length. All streamers must be of the same length.
- b) There shall be a clearly visible ink mark 2,5 m from the junction of the string and the streamer.
- c) The streamer shall be attached to the model in such a way that the ink mark is level with, or behind, the rearmost portion of the model (see sketch). The colour of the streamer must be different for each model in the heat. Each pilot/pit crew shall be issued with a second streamer at the start of the heat, to be used if required. This streamer shall be returned to the organiser if it remains unused.



STREAMER AND ATTACHING STRING SPECIFICATIONS

4F.9 Method of Starting

- a) All signals shall be both visual and acoustic.
- 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 starting positions.
- c) The motor must be started by flicking the propeller by hand.
- d) A first signal, given by the Circle Marshal, shall signify the beginning of the 60 seconds period when the mechanic(s) or the pilot have the opportunity to start, run and adjust their motor.
- e) A second signal, given by the Official Timer, shall signify the beginning of the combat period on or after which models may be launched.
- f) From the moment the signal to launch has been given the contest lasts for four minutes.
- g) When the Circle Marshal is satisfied that each model has completed two level laps, anticlockwise, separated by approximately half a lap, he will give a signal that the combat may commence.

- h) Combat may begin again after a restart signal from the Circle Marshal following an interruption when one or both models have been grounded. This signal shall be given as soon as the Circle Marshal is satisfied that there is approximately half a lap separation between the two models.

4F.10. Termination of Contest

- a) The Official Timer shall give an acoustic signal to terminate the contest four minutes after the signal to launch, i.e. five minutes after the first signal to run and adjust the motor.
- b) The same acoustic signal shall be given if the contest has to be terminated due to disqualification of one or both contestants or for any other reason.
- c) The Circle Marshal shall signal both pilots to fly level and anti-clockwise and to cease combat when both streamer strings have been cut.

4F.11. Method of Scoring

- a) Scoring shall commence from the signal to launch and continue for the four minute period.
- b) 100 points shall be awarded for each distinct cut from the opponent's streamer. There is a cut each time the model, propeller or lines, fly through the opponent's streamer resulting in paper particle(s) becoming detached from the streamer.
- c) A cut must contain at least one part of the paper streamer. A cut that contains string alone will not count.
- d) Should the string become detached from the model whilst airborne the competitor shall be penalised by 100 points and must immediately on a signal from the Circle Marshal land and replace the streamer. Ground time will be counted from the moment of such a signal being given. If, after a mid-air collision, no streamer string can be found and the streamer retaining device is missing or bent, then it is permissible to continue the heat without replacing the streamer, with the permission of the judges.
- e) One point shall be awarded for each whole second that the model is airborne during the four minute period.
- f) Each whole second of stay on the ground of the model shall be penalised by one point.
- g) Each warnable offence (see 4.F.14.) shall be penalised by the deduction of 40 points from the competitor's score.
- h) Should the mechanic(s) damage the streamer, or the model cut its own streamer, whilst the model is on the ground the mechanic(s) must replace it with a new streamer. If they launch the model without so replacing it, the competitor shall be penalised by 100 points. Ground time will be counted whilst the model is airborne with the damaged streamer.

4F.12. Attempts

Only one attempt will normally be allowed to complete a combat heat except for when:

- a) A streamer breaks or fails to unfurl from the rolled state.
- b) In the event of a model fly-away, as a result of the lines being severed by his opponent's model.
- c) In the event of a line tangle resulting in the control line(s) breaking.

For these exceptions the jury will grant a further attempt to complete the heat.

4F.13. Conduct

- a) A pilot must remain inside the centre circle while his model is airborne except at the moment of release of his model by the pit crew.
- b) During the combat period each competitor (and his pit crew) shall be watched by at least one member of the jury specifically assigned to him, in addition to the Circle Marshal, to ensure that they behave in a fair manner according to the rules.
- c) After a mid-air collision the heat shall continue as if both models had landed, subject to articles 4.F.15.c), l) and m).

4F.14. Offences

The following are warnable offences and shall attract the appropriate penalties (4.F.11.g):

- a) If a pilot unintentionally leaves the centre circle whilst his model is airborne.
- b) If the mechanic(s) enter the flight circle at an oblique angle or cut across the flight circle to reach a grounded model during the combat period. One penalty only will be incurred for each offence even if more than one mechanic is involved.
- c) If the mechanic(s)/pilot do not immediately or after a line disentanglement, withdraw a grounded model to outside the 20 metre circle prior to servicing it.
- d) If the model is launched prior to the signal signifying the beginning of the combat period.

4F.15. Cancellation of the Flight

An entrant will be eliminated from the heat and his opponent declared the winner if:

- a) He deliberately attacks the streamer of his opponent's model prior to the Circle Marshal's signal that combat may commence.
- b) His model fails to become airborne within two minutes of the signal to launch.
- c) He attempts to fly a model which at the time of launch does not have a strong workable control mechanism, or does not have a secure engine attachment, or does not have a running engine.
- d) He interferes with his opponent, or forces his opponent to leave the centre circle.
- e) He deliberately flies in a dangerous manner.
- f) He leaves the lines in the centre circle when his model is grounded.
- g) He attacks his opponent's streamer without his own, or the remaining parts, attached to his model.
- h) He is not present at his allotted flight time, unless he has the express permission of the Circle Marshal.
- i) He leaves the centre circle intentionally whilst his model is flying or without informing his opponent of his intention to do so when his model is grounded.
- j) He deliberately leaves the centre circle, for a purpose other than to allow his model to be serviced, without wearing protective head gear.
- k) He flies in such a manner as to inhibit his opponent, or his opponent's pit crew, from clearing any line entanglement.
- l) He flies other than level in an anti-clockwise direction when only his model is airborne and there is no line entanglement.
- m) For any other flagrant breach of the rules.
- n) He releases the handle, or removes the safety strap, for any reason while the model is airborne.
- o) His model does not conform to para 4.F.5.
- p) He deliberately attacks or interferes with his opponents continuously level flying model, which clearly has no paper streamer left.
- q) If the streamer string becomes detached from the streamer retaining device during combat, but not as a result of a mid-air collision.
- r) If the model lands with no streamer string and the streamer retaining device is missing or bent, but not as a result of a mid-air collision.
- s) If the mechanics jump over the opponent's equipment.

4F.16. Classification

- a) The contest shall be run as a knock-out tournament.
- b) The contestant 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) Each round shall be randomly drawn (subject to 4.F.16.j) from the competitors remaining in the competition.
- e) In the event of an unmatched competitor remaining in any round, that competitor shall be matched with the first competitor drawn (subject to 4.F.16.j) in the next round and, (if he is not first eliminated) in each successive round, unless such time as there is again an unmatched

competitor remaining in a round. At that time, these two competitors shall be matched (subject to 4.E.16.j) to complete that round.

- f) The number of wins minus the number of losses, "wins-losses", shall be used to determine placings with the highest score placing highest.
- g) In the event of a tie for second or third place (both cannot happen) fly them off using the above procedures except allowing only one loss during the fly-off.
- h) In the event of a two way tie for third remaining after a fly-off for second, match them with the winner to take third.
- i) 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 five points or less.
- j) 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.

4F.17. International Team Classification

- a) Each competitor shall be ranked according to his wins minus number of losses, not counting fly-off heats, with the fly-off heats being used to establish second and third place as necessary.
- b) The competitors "wins - losses" scores, not counting fly-offs, shall be added for the participants of each nation.
- c) Nations shall be classified with the highest scores obtained in 4.F.17.b), considered highest in position.

4F.18. Judges and Timekeepers

- a) The organiser shall appoint a panel of three CIAM approved judges (for open internationals needs only one to be CIAM approved) and who shall be of at least two different nationalities. The judges must have at least one language in common.
- b) Two timekeepers/scorers shall be allotted to each competitor.