FAI Sporting Code

Fédération Aéronautique Internationale

## Section 4 - Aeromodelling

Volume F7 Aerostats

2010 Edition
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No change to 2009 Edition

F7A - HOT AIR BALLOONS

## FEDERATION AERONAUTIQUE INTERNATIONALE

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## VOLUME F7

## SECTION 4C - MODEL AIRCRAFT - F7 - AEROSTATS

7.1 Class F7A - Hot Air Balloons

THIS 2010 EDITION INCLUDES THE FOLLOWING AMENDMENTS MADE TO THE 2009 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 | Change incorporated by |
| :---: | :---: | :---: | :---: |
| n/a | n/a | There were no changes at the 2009 Plenary Meeting | n/a |
| 7.1-7.1.11.9 | 2008 | Completely re-structured with different paragraph numbers | Marcel Prevotat F7 S-C Chairman |
| Page 9 |  | Amended title to Aerostats |  |
| 7.1.1.1 |  | Amended text to aerostats and new last paragraph regarding weight of gas. |  |
| 7.1.2.2 |  | Added text for identification |  |
| 7.1.4 |  | Completely re-written for organiser responsibilities |  |
| 7.1.6 |  | Two new paragraphs for competitor responsibilities |  |
| 7.1.7.2 |  | Amended for responsibilities of the re-fuelling official |  |
| 7.1.8.2 |  | Amended and additional text regarding flight rules |  |
| 7.1.9 |  | Amended for protest fee and timings |  |
| 7.1.10.1 |  | Amended to include penalties and zero scores |  |
| 7.1.10.1.a |  | Amended table regarding minimal precision |  |
| 7.1.10.1.b |  | Amended regarding the calculation of the time |  |
| 7.1.10.3 |  | Amended regarding competition scoring |  |
| 7.1.11 | n/a | Add a line for clarity | Technical Secretary |
| 7.1.11.4-7.1.11.8 | 2008 | Amended regarding fox, line, area \& circle tasks | Marcel Prevotat F7 S-C Chairman |
| 7.1.11.9 |  | Clarification and additional text for combined tasks |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |


| Four-Year Rolling Amendments for Reference |  |  |  |
| :---: | :---: | :---: | :---: |
| Paragraph | Plenary meeting approving change | Brief description of change | Change incorporated by |
| 7.1.3.2 | Rationalisation of terms throughout | Change "can" to "may" | Jo Halman Technical Secretary |
| $\begin{aligned} & \text { 7.1.10, 7.1.10.1, } \\ & \text { 7.1.10.2, 7.1.11.1, } \\ & \text { 7.1.11.2, 7.1.12.1 } \end{aligned}$ |  | Change "pilot" to "competitor" |  |
| 7.1.11.1 |  | Change "organising committee" into "Organisers" |  |
| Rule Freeze | 2006 | Rule freeze reduced to two years \& provisional classes not included in the rule freeze | Jo Halman Technical Secretary |
| 7.1.1 \& 7.1.2 |  | Text split into two paragraphs and all subsequent paragraphs re-numbered appropriately |  |
| 7.1.3 |  | Paragraph title changed and text split into three paragraphs |  |
| 7.1.3.3 |  | Two new sentences regarding target responsibility and early advice |  |
| 7.1.5 |  | Add the requirement for an anemometer |  |
| 7.1.6 |  | Move the text r3lating to safety to 7.1.10 |  |
| 7.1.7 |  | Addition of judges and assistants |  |
| 7.1.8 |  | Additional text regarding judges |  |
| 7.1.9 |  | Add "and Helpers" to the paragraph title \& define number of balloons and helpers' duties |  |
| 7.1.10 |  | Amend the text regarding safety \& disqualification |  |
| 7.1.10.1 |  | Change text to "common electric mass" |  |
| 7.1.10.2 |  | Additional rules regarding re-fuelling |  |

Four-year Rolling Amendments for Reference.../cont

| Four-Year Rolling Amendments for Reference |  |  |  |
| :---: | :---: | :---: | :---: |
| Paragraph | Plenary meeting approving change | Brief description of change | Change incorporated by |
| 7.1.10.3 | 2006 | Define when flights are allowed and the maximum wind before flights are forbidden | Jo Halman Technical Secretary |
| 7.1.11.1 \& 11.2 |  | Organisers' responsibilities moved from 7.1.11.2 |  |
| 7.1.12 |  | Add "During Tasks" to the paragraph title \& add "free flight" at end of paragraph |  |
| 7.1.12.2 |  | Re-structure the whole paragraph with some additional text and some deletions |  |
| 7.1.12.3 |  | Define Flight Director's duties regarding flights |  |
| 7.1.13 |  | Extend the time period to two weeks for a protest regarding results |  |
| 7.1.14 |  | Change the paragraph title to "Results" |  |
| 7.1.14.1 |  | Change the paragraph title to "Basic Score" and define the scoring system including a table |  |
| 7.1.14.2 |  | Change the paragraph title to "Calculated Score" |  |
| $\begin{aligned} & \text { 7.1.15.1-7.1.15.5 \& } \\ & \text { 7.1.15.7 \& 7.1.15.8 } \end{aligned}$ |  | Delete unnecessary text regarding scoring with some additional text in places. |  |

## RULE FREEZE FOR THIS VOLUME

With reference to paragraph A. 12 of Volume ABR:
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, but in step with the World Championship cycle of each category.

Volume F7 contains only provisional classes and is not, therefore, subject to this restriction.
The only exceptions allowed to the two-year rule freeze are genuine and urgent safety matters, indispensable rule clarifications and noise rulings.

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# VOLUME F7 <br> TECHNICAL REGULATIONS FOR RADIO CONTROL AEROSTATS 

### 7.1 CLASS F7A - HOT AIR BALLOONS

### 7.1.1. General Definition

### 7.1.1.1 Characteristics

A hot air balloon is an aerostat, supported statically in the air, with no means of propulsion by any power source, which obtains its lift only as a result of heated air. The envelope may contain no gas other than air and the normal products of combustion.

The hot air is produced by one or several radio-controlled burners using gas provided by onboard cylinders. The cylinders and the radio equipment are most often in a basket (not mandatory).

The hot air balloons must fit the national regulations for model aircraft (size, weight etc).
The weight of gas is limited to 5 kg whatever the size of the balloon.

### 7.1.2 Marker, Identification and Target

### 7.1.2.1 Marker

A marker is provided for each competitor by the organisers. The markers must be of similar size and weight. The markers must be identified. Personal markers are not allowed. The competitor is allowed to make minor changes to adapt the marker to the dropping unit. The drop of the marker is radio controlled.

### 7.1.2.2 Identification

The organisers may implement additional identification items for the competitor, his assistant(s) and his balloon(s). For international contests, each model shall carry a model identification code on the envelope and on the basket (nationality plus FAI or NAC licence number of the competitor).
7.1.2.3 Target

The Flight Director is responsible for the target management.
The target should be advised early enough to allow the competitors to adapt their flight.
The target must be physical and clearly visible by the competitors.

### 7.1.3 Competition Site and Tasks

### 7.1.3.1 Refuelling Area

The place for refuelling the cylinders of the balloon from master cylinders or tanks must be defined and secured by the organisers.

### 7.1.3.2 Inflating and Take-off Area

These areas must be away from the refuelling area. They must be defined by the Flight Director. It is necessary to have specific equipment (such as helium balloons, wind vane etc) to verify the wind conditions. An anemometer must be provided by the Organisers to measure the speed of the wind.

### 7.1.3.3 Flight Site

The flights are most often outdoor flights (airport, aeromodelling site, open land etc) but indoor flights may be utilised in the case of adverse weather conditions. The flight site must fit the safety rules, be in accordance with the general rules for aerial circulation, have the necessary agreements from the appropriate authorities or owners and must allow normal flight of the balloons.

### 7.1.3.4 Competition and Tasks

A competition is made up of several tasks.
A competition is valid if a minimum of three tasks (of which two are different) are validated. There is no upper limit of the number of tasks.

Several examples of tasks are provided in the last chapter but any task can be created provided it is fully explained to the competitors, the Panel of Judges and the Contest Officials.

### 7.1.4 Organisation

The Organiser must provide suitable sites (outdoor/indoor) that allow flights under any weather conditions with full performance of the competitors and safe recovery.

The Organiser is responsible for the control of the equipment, weight of the balloons (full gas included), safety, frequencies and insurances. This should be undertaken by the Organiser prior to competitors beginning the first task.

Local rules established by the Organiser must be published no later than the latest bulletin made available to all competitors, preferably in advance of the entry deadline and early enough to allow each competitor to adapt his balloon(s).

The Contest Director is in charge of the organisation. He is responsible for the good management and smooth and safe running of the event. He shall make operational decisions in accordance with the rules of the Sporting Code. He must secure a sufficient number of qualified officials (Panel of Judges and Contest Officials), provide the necessary equipment (electronic stopwatches, distance measurement devices, target equipment, helium balloons, anemometer etc), provide gas and nominate a person to be responsible of the refuelling area before the beginning of the competition.

The Organiser must display the results of each task throughout the contest and publish the final results afterward. The official results must be published within one month of the end of the competition.

### 7.1.5 Panel of Judges

### 7.1.5.1 Composition and Responsibility

The Panel of Judges must have a Chairman, a Flight Director and one or more judges. The Panel of Judges must be defined prior to the start of the competition and the members shall be chosen for their competence in Hot Air Ballooning.

For International competitions, refer to rule ABR, Contest Officials (chapter B4).
It is the responsibility of the Panel of Judges to make any decision dictated by competition circumstances that may arise. It can penalise/disqualify a competitor for misconduct or infringement of the rules.

Any decision from the Panel of Judges is obtained by majority vote and in the case of a tie the Chairman makes the final decision.

### 7.1.5.2 Flight Director

The Flight Director must be a recognised pilot of radio controlled hot air balloons.
He defines the tasks and the flight conditions (take-off area, targets, timing, maximum measured distance, restart allowance etc), controls the evolution of the tasks and validates the tasks.

The Flight Director may:
cancel a task if the weather conditions do not allow a normal and equal flight between competitors, invalidate a task if all competitors receive a zero "flight score".

### 7.1.5.3 Contest Officials

The Panel of Judges may get help from Contest Officials provided that these Contest Officials are qualified or trained for the activity they have to perform. The Contest Officials are in charge of distance and time measurements, observation and reporting to the Panel of Judges of any deviation occurring during the competition.

### 7.1.6 Competitor and Helpers

It is the competitor's responsibility to obtain the latest issue of the competition rules.
Unless specific conditions apply, entry is closed at a date defined by the Organiser.
By his entry, the competitor recognises that he accepts, and will comply with, the competition rules and the safety rules. The competitor must comply with the national regulations for air models such as (but not limited to): authorisations, pilot degree, insurances, radio equipment, gas handling, balloon features (volume, weight, radio equipment etc). Unless specific agreement is obtained from authorities, the radio frequencies must fit the regulations of the organising country.
A competitor is taking part in the competition as soon as he takes part in one task.
A competitor may compete with one or two balloons but structural exchanges (such as basket or envelope) are not allowed between the two balloons. A competitor competing with two balloons may use only one frequency. Only one balloon may be used during any task.

A competitor may not share his balloon with other competitors.
A competitor may be helped by one or several helper(s). The helpers may act during inflating, during take-off and after recovery of the balloon but not during the flight.

### 7.1.7 Safety Rules

The handling of highly flammable gas (including liquid phase) requires strict observation of the safety rules.

The Organiser and the Panel of Judges must always observe, comply with and apply the safety rules and ensure that competitors, organisers and any other person on the flying site complies with the safety rules. The Panel of Judges will summarily disqualify, without right of appeal, any competitor who infringes or ignores the safety rules and will exclude from the flying site any other person who deliberately infringes or ignores the safety rules.

Specific attention must be drawn to:
fire risks, personal risks, environmental risks;
electric lines, roads, railways, houses, farms, crops etc;
restricted or protected areas (military sites, fuel storage sites etc).
Each competitor must have his own safety equipment (gloves, extinguisher).

### 7.1.7.1 Hot Air Balloon

The cylinders must comply with the national regulations. The cylinders must have a security gauge. Pressure testing can be requested in some countries. The cylinders must be cleaned periodically but proof of the cleaning/testing is not requested. Suspect cylinders must be rejected.

The competitor must be able to stop any flight presenting risk to the public or to the environment. The balloon must have a safety system allowing cessation of flight as required (such as: cut of lighter, cut of gas flow, time cut of burners etc). Additional equipment can be requested by national rules, and/or local rules.

A common electric mass is recommended (suspension of envelope, loading unit, cylinders, gauges, radio receiver). The propeller of the inflating device must be protected.
cont/...

### 7.1.7.2 Refuelling Area

The person responsible for the refuelling area has full authority to avoid/stop refuelling/emptying whenever the safety rules are not implemented or followed.

The area must be a restricted area (allowed personnel only, no smoking, no flames), well ventilated and isolated from the public, the inflating area and the take-off area. The area must not have any place where gas can accumulate. The area must allow fast evacuation.

The refuelling/emptying is under the sole responsibility of the competitor. Smoking, the use fire lighters, testing of burners and the running of electronic equipment such as, but not limited to, radio equipment, cameras and phones are strictly forbidden in the refuelling/emptying area. Specific equipment allowing several competitors to refuel can help and speed up the operation. An earth linkage is suggested. Gloves should be worn during refuelling.

### 7.1.7.3 Take-off and Flight Area

Free flights are not allowed prior to sunrise or after sunset.
Flights are not allowed if wind speed exceeds $7.2 \mathrm{~km} / \mathrm{h}(2 \mathrm{~m} / \mathrm{s})$ measured at 2 m above the ground at the take-off area.

Suitable extinguisher(s) must be available.

### 7.1.8 General Rules During Tasks

### 7.1.8.1 Hot Air Balloon

No outboard heating or refuelling is allowed during flight.
Out of specific tasks (ie circle) the balloons should have no material link with the ground (free flight).

The balloon must not transmit any positioning or flight information to the competitor or to the helper(s).

The lowest part of the balloon (except radio antenna) determines the point of contact with the ground (landing).

No structural changes are allowed except for safety equipment and radio receiver.
Prior to each task, removable weights may be added or subtracted.

### 7.1.8.2 Flight Rules

These flight rules also apply to the balloon provided by the Organiser (fox)
The Flight Director chooses the take-off area based on the task to be performed and on the weather conditions. This area may be different from the inflating area.

Unless otherwise advised by the Flight Director prior to the beginning of a task, the competitor may restart his flight provided he clearly announces his intention prior to dropping or landing and he respects the timing of the task. Restart is considered a new take-off and should be performed from the take-off area. If several attempts are allowed only the last one is considered for scoring purposes.

Take-off from outside the take-off area is a zero flight for the competitor.
During any task, the competitor is allowed to follow his balloon and to receive external advice.
After leaving the take-off area, any contact of any part of the balloon with any person or the ground is considered a ground contact. Nevertheless, under specific weather conditions, some bounces may be accepted when leaving the take-off area.
Contact with obstacles which may affect the normal evolution of the balloon (such as trees, poles, buildings etc) is not considered as a ground contact. The first contact with obstacles incurs one penalty, the second contact two penalties and so on. Deliberate contact used as a strategy for the flight incurs a zero score for the offending competitor.
Deliberate vertical contact of a balloon with other balloons is not allowed and penalties up to a zero flight for the offending competitor can be applied.

Unless a competitor has announced his decision to restart his flight, any contact from the competitor (or from helper) with the balloon prior to dropping or landing incurs a zero flight score.

Marking (marker on the ground) or landing should occur before the target closes otherwise the competitor will receive a zero flight score. The marker must be on the ground for the flight to count for scoring. If the dropping of the marker fails, the competitor may replace the marking with a landing. The first contact with the ground is then retained. No complaint will be accepted for the unexpected dropping of the marker.

The position of ground contact by the balloon is solely the decision of the Contest Officials.
Any displacement of the marker, or of the landing position, by the competitor or by his helper(s) disqualifies the competitor for the whole competition.

After dropping the marker, or after the positioning of the landing, the balloon should be quickly drawn away to allow the other competitors to score under normal conditions.

The task of the competitor is completed by the target closing, or the marking, landing or withdrawal of the balloon.

### 7.1.8.3 Tasks

Prior to the beginning of a task, the Flight Director must clearly inform the Panel of Judges, the Contest Officials and the Competitors of the type of task, the take-off area and of the management of the timing (flight opening, end of take-off time, target opening, target closing). These times are advised using any convenient system (horn, loud-speaker etc).

The opening of the flight must be advised early enough to allow the competitors an immediate take-off after flight opening. The competitor is free to decide when he will take off provided he does it during the allowed period.

### 7.1.9 Explanations and Protests

A competitor may ask for explanations from the Flight Director. He is allowed to verify (or have verified on his behalf) his own results and the related calculations. If he disagrees with the results or if he contests attitudes or decisions, he may present a protest to the Contest Director. This protest must be in writing and accompanied by a fee of 35 Euros. The fee is returned only if the protest is upheld.
Before the opening of the contest, protest must be lodged at least one hour before the opening of the contest. During the contest, protests should be submitted immediately (prior to the starting of the next flight). After announcement of the final results, any protest should be submitted within 15 days after announcement of the results.

### 7.1.10 Results

### 7.1.10.1 Basic Score

For each task, the competitor gets a basic score, which is the total of the flight score, of several bonuses (one take-off bonus, one or several intermediate bonus(es) and one precision bonus) and of penalties. The basic score cannot be negative.

The maximum flight score is 1000 points.
The bonuses (take-off, intermediate, precision) are 100 points each.
The penalties are 250 points each.
The "flight score" is based on distance or on time measurements.
The flight score is zero if:

- take-off is out of the take-off area;
- take-off out of the take-off opening time;
- drop of the marker or landing is out of the target opening time.
cont/...
(a) Distance

The maximum measured distance is clearly advised by the Flight Director before the task begins. This distance is adapted to the local conditions and to the measurement devices.

The use of a laser measurement device is suggested.
The distance is rounded or not to the closest precision unit according to the calculation means.

| Maximum <br> measured <br> distance (MMD) | Minimal <br> Precision <br> (0.1\% of <br> MMD) | Loss of points from <br> max flight score | Precision bonus if <br> (distance <1 \% of MMD) |
| :---: | :---: | :---: | :---: |
| 100 m | 10 cm | 1 point $/ 10 \mathrm{~cm}$ | distance $<100 \mathrm{~cm}$ |
| 50 m | 5 cm | 1 point $/ 5 \mathrm{~cm}$ | distance < 50 cm |
| 10 m | 1 cm | 1 point $/ 1 \mathrm{~cm}$ | distance $<10 \mathrm{~cm}$ or in the container <br> (outdoor circle) |
| 5 m | 0.5 cm | 1 point $/ 0.5 \mathrm{~cm}$ | distance $<5 \mathrm{~cm}$ or in the container <br> (indoor circle) |

b) Time

The time is calculated using only entire obtained tenths of a second.

### 7.1.10.2 Calculated Score

The aim of this calculation is to give the same weight to all the tasks of a competition.
For each task, the best competitor obtains a calculated score of 1000. The calculated score of the other competitors is a ratio to the basic score of the best competitor:

Calculated score $=1000 \times$ (basic score of competitor/basic score of the best competitor)
The ranking of each task is based on the calculated scores.

### 7.1.10.3 Competition Score and Ranking

If the competition has four or more tasks, the lowest calculated score for each competitor is discarded. Otherwise, all the calculated scores are retained.

The competition score is the total of the retained calculated scores divided by the number of retained tasks.

The competition ranking is obtained from the competition score.
The annual total of the competition scores can be used (per se or not) for an annual ranking of the competitors.

### 7.1.11 Potential Tasks

(Not limited to those described here)
All the necessary information for the completion of the task shall be advised by the Flight Director to the Panel of Judges, the Contest Officials and the competitors.

### 7.1.11.1 Target

Prior to the flight, the Flight Director places, or permits to be placed, a target where he wants on the flight area. The competitor takes off from a limited take-off area and should drop/land as close as possible to the target.
cont/...

### 7.1.11.2 Hesitation Waltz

Prior to the flight, the Flight Director places, or permits to be placed, several targets on the flight site. The minimum distance between the targets should be double the maximum measured distance.
The competitor takes off from a limited take-off area and should drop/land as close as possible to the target he chooses.

### 7.1.11.3 Back Home

Prior to the flight, the Flight Director places, or permits to be placed, a target where he wants on the flight area.

The competitor takes off from a large take-off area allowing the competitor to choose a suitable take-off place. He must drop/land as close as possible to the target.

### 7.1.11.4 Fox

A first balloon (fox) is provided and flown by the organisers (not by a competitor).
The target is either the dropped marker of the fox or the landing position of the fox (to be defined prior to starting the task). The flight of the competitors is opened a short time after the take off of the fox ( 30 seconds is suggested). The competitor decides when he will take off. He must drop/land as close as possible to the target.

### 7.1.11.5 Line

Prior to the flight, the Flight Director defines the target as a physical line on the ground and advises if the drop/landing should be performed before, after or before and after the line.

The competitor takes off from the take-off area and must drop/land as close as possible to the target.

### 7.1.11.6 Area

Prior to the flight, the Flight Director defines a specific area on the ground (ie sport place). The competitor takes off from the take-off area and must drop in the defined area and then land in the area. The objective is to get the maximum distance between drop and land. The competitor is not allowed to restart his flight.
The distance between the marker and the landing (unit to be advised) is directly used to get the flight score. There is no precision bonus.

### 7.1.11.7 Stationary

The aim is to remain at a constant height from the ground for the maximum measured time.
The height is defined by the Flight director by using a rope. This rope is fixed to the basket by the competitor. The length of the rope must be short (around 25 cm ) for indoor flights and longer (around 1 m ) for outdoor flights. The free end of the rope must have a small weight to ensure the rope remains taut.

The competitor decides the beginning of the time to be counted. The time is stopped either by contact of the basket with the ground or by the rope losing contact with the ground.

The maximum measured time is 250 seconds. Each tenth of second is 0.4 point. There is no precision bonus.

### 7.1.11.8 Circle

A circle is marked on the ground.
The diameter of the circle should allow a normal run for the competitor ( 3 times the diameter of the task area). For the indoor task, 5 m or 10 m diameter is suggested and 10 m for outdoor task..

The target is a container (around 5 cm diameter indoor and around 10 cm diameter outdoor) placed at the centre of the circle. The height of the container should not exceed 5 cm . The competitor guides his balloon toward the target using a rope which length is equal to the diameter of the circle. One end of the rope is fixed to the basket. The competitor is not allowed to enter the
circle or to hold the rope in any other way than at the end (one penalty for each infraction). The flight time is limited to 5 minutes starting when the marker enters the circle.

The precision bonus is obtained if the marker is dropped and remains in the container.

### 7.1.11.9 Combined tasks

Combined tasks are made up of several tasks performed during the same flight.
The failure to complete a task does not prevent the competitor attempting to perform the next task, nor should the flight be stopped.

The Flight Director must clearly advise the combination of the tasks, the flight timing and the flight/scoring conditions.

For each task, the 3 types of bonus and the penalties are applicable (unless there are restrictions in the tasks).


[^0]:    1 FAI Statutes, Chapter 1, para. 1.6
    2 FAI Sporting Code, General Section, Chapter 3, para 3.1.3
    3 FAI Statutes, Chapter 1, para 1.8.1
    4 FAI Statutes, Chapter 2, para 2.1.1; 2.4.2; 2.5.2; 2.7.2
    5 FAI Bylaws, Chapter 1, para 1.2.1
    6 FAI Statutes, Chapter 2, para 2.4.2.2.5
    7 FAI Bylaws, Chapter 1, para 1.2.3
    8 FAI Statutes, Chapter 5, para 5.1.1; 5.5; 5.6
    9 FAI Sporting Code, General Section, Chapter 3, para 3.1.7
    10 FAI Sporting Code, General Section, Chapter 1, paras 1.2. and 1.4
    11 FAI Statutes, Chapter 5, para 5.6.3
    12 FAI Bylaws, Chapter 1, para 1.2.2

