

2010 SAE BRAZIL AERODESIGN COMPETITION

MAJOR RULES MODIFICATIONS (2010 WITH RESPECT TO 2009)

Link for 2009 Regulations:

[saebrasil.org.br/eventos/aerodesign2009/arquivos/Regulations_SAE AeroDesign 2009 \(English\)\(Rev_00\).pdf](http://saebrasil.org.br/eventos/aerodesign2009/arquivos/Regulations_SAE AeroDesign 2009 (English)(Rev_00).pdf)

1. Introduction

In order to minimize the impact of the absence of the English version of the Regulations this document contains relevant information to support the design.

2. General Rules Changes

2.1 Radio Control

PCM radio is mandatory. 2.4GHz radio is allowed as an alternative.

2.2 Voltwatch

For all classes the use of a commercial voltwatch is mandatory.

2.3 Flight Video

Maximum score of 10 points in 2010 instead of 5 points in 2009.

2.4 Qualifications Flight

Regular Class minimum Payload: 4kg

Open Class minimum Payload: 10kg

2.5 Report

Total Score: 220 points

New technology to be evaluated → Electrical Design: 20 points.

Maximum page allowed: Micro Class: 35; Regular Class: 37; Open Class: 45.

One of the plans of Regular Class may be in A2 format. (ONLY ONE, to be chosen by the team)

3. Regular Class Major Rules Modifications

3.1 Cargo Compartment (Payload Bay)

The aircraft must have only one compartment for positioning the cargo (or payload). The compartment should have parallelepiped geometry, and can have its dimensions at the team choice, but neither side of this parallelepiped may exceed 500mm.

3.2 Dimensional Restriction

Sum of dimension shall be within 4.0 and 6.5 meters. (For reference see Section 2.2 of 2009 Regulations)

3.3 Dimensional Precision

Airplane with sum of dimension inside the allowed range (4 to 6.5 meter):

Maximum allowed error without penalty: $\pm 0.60\%$ of the sum specified in the report.

Error in excess of $\pm 0.60\%$: 2 point penalty for each 0.1% exceeding the maximum allowed error. (Example: 0.764% error \rightarrow 0.164% exceeding, resulting in 3.27 point penalty)

Airplane with sum of dimension lower than 4 meter:

2 points for each 0.1% error. (Example: 0.95% error \rightarrow 19 points penalty)

Airplane with sum of dimension greater than 6.5 meter:

2.5 points for each 0.1% error. (Example: 0.692% error \rightarrow 17.31 points penalty)

3.4 Payload score modified

1 point for each 0.1 kg of payload for both takeoff sectors.

3.5 Other Changes

Accuracy Equation changed

Structural Efficiency score modified

FPV factor inserted in Regular Class (see Section 7.10.3 above)

Distance for landing Bonus point changed to 61 meters (2009 → 122 meter)

Score for Minimum Volume Box changed.

4. Translation of some specific 2010 Regulations Section

Section 6.7 - Sending Documents in electronic format

Some documents in special may be sent via email, CD, DVD or any other way to the technical committee.

These documents shall comply with the following rules:

- Mandatory file format for text, plans, drawings etc.: PDF
- Accepted file format for figures; JPG
- Accepted file format for videos: WMV
- Maximum email size: 5Mb.

Section 7.10.3 - Empty Weight Prediction

Aiming to encourage teams to improve their engineering processes and as well as build and thoroughly test their aircraft as early as possible, a factor called Empty Weight Prediction Factor (FPV) was inserted.

This factor is calculated using the following formula, with weight in kilograms (kg):

$$FPV = 1.10 - 15 \times \text{abs}[(\text{Predicted Weight} - \text{Actual Weight}) / \text{Predicted Weight}]^2$$

The FPV is inserted into the score of each battery as follows:

$$\text{Flight Points} = \text{FPV} \times (\text{Payload Score} + \text{Structural Efficiency Score})$$

The FPV for the Regular Class only affects the score on two items above. This does not come as a multiplier of other bonuses.

Minimum FPV is 0.95. If the FPV calculated is less than this value, the Minimum FPV is used.

It is extremely important and recommended that the calculation procedures used for determining the empty weight, as well as experimental methods, are detailed in the Project Report. It should be noted that the use of engineering processes to define the empty weight is considerably more valued during the assessment of reports compared with 'simple estimates'.

The expected empty weight must be included in the plant that contains the 'three views' of the aircraft. This value **MUST** also be clearly stated in the Project Report.

The value of the empty weight must necessarily be inserted into the Spreadsheet and Database Parameters (template) as described in Section 11.3.

Failure to send the empty weight of the aircraft automatically implies the adoption of minimum FPV quoted above.

Under any circumstances corrections of the empty weight after the date of reporting will be accepted. The empty weight must be predicted during the design phase and should be sent without fail, in the spreadsheet cited above and in the Report.

If there are discrepancies between the values in Report and the spreadsheet, the value to be considered is the one sent in the spreadsheet.

Section 10.1.1 - Call for safety inspection

Teams will be called as follows:

- For the first 3 rounds (Qualifies), the teams will be called according to score, i.e., the 1st place is called first, then the 2nd place, and so on.

- For competition rounds, the teams will be called in inverse order of score, i.e., the last placed is called first, then the penultimate, and so on.

For the order of the teams, the notes are always considered the most updated score at the instant the call for a round starts:

- 1st round (classification): direct order of project score
- 2nd round (classification): direct order of project score
- 3rd round (classification): direct order of project score
- 4th Battery (competition): reverse order of the notes updated to the 2nd round
- 5th Battery (competition): reverse order of the notes updated to the 3rd round

And so on...

Teams will be called three times to provide for the safety inspection at intervals of five minutes between each call. After five minutes of the last call (15 minutes from first call), the team is automatically out of this battery, and will have to await the next.

No exceptions will be opened with respect to the order calling the teams.

NOTE: It is the responsibility of the team, be attentive to the call of preparation for flight.

Section 11.2.1.2 - International Teams - Important Observations

The complete report (with plans and charts) **MUST BE** sent via email (see Section 6.7).

It is recommended to insert the CD's **inside** one of the copies of the report, and identify the package as 'Technical Report'.

In Brazil there are special rules for international packages containing CD's, which in 2009 causes some delay in receiving.

For sending videos and other files that exceed the size specified in Section 6.7 an alternative way will be evaluated.

Section 11.3 - Spreadsheet of Parameters and Data

The teams must send along to the CD a copy of the data sheet "AD2010_Template.xls", with all the requested data filled.

The spreadsheet should be downloaded from the site of SAE: < www.saebr.org.br >.

If there is the inability to download this worksheet, the team must submit all required data in a spreadsheet similar, made by the team itself.

The format of the spreadsheet mentioned can be seen in the figure in page 78 of Regulations.

The submission of this spreadsheet is **mandatory**, and its absence from the CD data could entail a penalty of 10 points for the team.

This spreadsheet must necessarily be renamed "team number Data_2010.xls" for easy identification and compilation of data.

APPENDIX 15 Dates and Important Documents

Documents	Deadline
Subscription payment receipt and subscription sheet	At subscription
Statement of responsibility (APPENDIX 9)	
Inform radio control frequency	After the subscription
Authorization for airplane reuse (or parts and assemblies not modified from 2009 airplane)	June 14, 2010
Inform design changes. Design changes reported until this date are subject to penalties less severe compared to those reported or identified after this deadline.	September 13, 2010
Proof of enrollment in school in the second half of 2010	
Five (5) technical reports bounded (APPENDIX 14)	Deadline for posting without penalty is: July 26, 2010 (Monday) Deadline for posting with penalty is: August 23, 2010
CD containing an electronic copy of the technical report (section 11.2)	
Extra copy, not bounded in technical reports, of the payload prediction chart (section 11.5)	
Additional plans and documents required in section 6.15 (Propeller), 8.2 and 9.3 (when applicable)	
Monitoring report (Open Class). The items set out in Minimum Requirements report (RMPT – APPENDIX 12) MUST be received by this date.	<u>September 13, 2010</u>
Video of a flight test (sections 7.7, 8.7 and 9.8): Regular Class and Micro Class (Maximum 10 points bonus, according to video quality) and Open Class (sending is mandatory)	September 27, 2010
Contact SAE if a SAE pilot will be needed.	October 04, 2010
Report concerning flight with critical engine inoperative (Open Class) Section A.12.2.2.3	September 13, 2010
Statement that the plane has flown (successfully tested) (APPENDIX 11)	At competition reception (Until midday of October 21, 2010)
Term of agreement with the document "Procedimentos Operacionais" (in English : "Operational Procedures")	
Copy of ABA card (registration in Brazilian Association of Aeromodelling) for Brazilian pilots or similar for international teams (registration in the "Association of Aeromodelling" of the respective country)	
Filled form for pilot change, if needed (including for SAE pilot needing) (APPENDIX 10)	
Reception of the teams	October 20 and 21, 2010
Oral presentations	October 21, 2010
Flight competition (date to be confirmed)	October 22, 23 and 24, 2010
Deadline for submit complaining, points errors and classification errors, detected in premiation day	Until 5 days after competition ending
Official issue of Teams Points and classification table	10 days after competition ending

This document does not exclude the presence of other modifications in the regulation. It is intended only to guide the teams. It is responsibility of the team to check regulation in detail.