

## Formula Student Germany 2007 Rules

In general FSG 2007 Rules comply with the Formula SAE® 2007 Rules:  
<http://students.sae.org/competitions/formulaseries/rules/>

### Revised Version 1.3. - January 09, 2007

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All earlier versions are invalid!

Changes from Version 1.2 to Version 1.3 are bolded and marked with *\*changed from 1.2 – 1.3\**.

### Extensions or Changes to the FSAE® 2007 Rules

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#### Rule 1.6 Official Languages

Formula Student Germany Official Language: English

#### Rule 2.1.2. Society Membership

Students of a German Team must be member of the VDI, all other participants must be member of a Fisita Organisation.

#### Rule 3.2.5 Brake Systems

All plastic brake lines that do not have metal braid as protection are subject to approval by the FSG Chief Scrutineer. Documentation must be handed in via e-mail to [rules@formulastudent.de](mailto:rules@formulastudent.de)

#### Rule 3.3.2 Structural Equivalency

The technical review is initiated by completing the “Structural Equivalency Form” using the FSG format given in Appendix FSG A-A. The form must be submitted no later than the date given in the “Action Deadlines” located on the Formula Student Germany Website.

*IMPORTANT:* ALL teams must submit the form FSG A-A. If the chassis complies with the rules, the form must be signed as “Compliant to the rules”.

#### Rule 3.3.6.3 Impact Attenuator *\*changed from 1.2 – 1.3\**

In case of using a foam filled impact attenuator or a honeycomb impact attenuator, a 1.5 mm **solid** steel metal sheet (per Section Rule 3.3.3) or 4.0 mm aluminium metal sheet must be integrated in the impact attenuator. The metal sheet must have the same size as the front bulkhead. The metal sheet can be welded or screwed by using 6 mm Grade 8.8 bolts to the front bulkhead.

#### Rule 3.3.6.4 Impact Attenuator Data Requirement

The calculations are initiated by completing the “Impact Attenuator Form” using the format given in Appendix FSG A-B. The form must be submitted no later than the date given in the “Action Deadlines” located on the FSG Website. The calculations and/or test data must be submitted online in Adobe Acrobat ® format (\*.pdf file) via upload on the FSG Website.

### Rule 3.4.10.1 Firewall

In case of using a non metal material for the firewall (i.e. carbonfibre, fibreglass etc) a fire resistant heat protection shield with a metal surface must be fitted to the firewall.

### Rule 3.4.9.2 Cockpit-mounted Master Switch

The cockpit-mounted master switch must be a push/pull emergency switch. The switch must be installed such that: (a) from the ON position, pushing the switch will disable power to the ignition and all fuel pumps, and (b) from the OFF position, pulling the switch will enable power to the ignition and fuel pump(s). The switch may act through a relay.

Note: Please make sure that the relay is made for the ampacity in your electrical system by using e.g. High Current Automotive Relays.

Example: [http://www.formulastudent.de/fileadmin/user\\_upload/all/2007/rules/FSG\\_Relay\\_Proposal.pdf](http://www.formulastudent.de/fileadmin/user_upload/all/2007/rules/FSG_Relay_Proposal.pdf)

FSG suggests disabling ALL electrical systems in the car, without using a relay.

### Rule 3.5.3.9 Air Intake and Fuel System Location Requirements

Throttle Body shield

If the throttle body is located forward of the firewall and is not covered by any body work panels, a protection shield must be fitted to the throttle body to protect the driver from any kind of backfire from the intake system.

### Rule 3.6.2 School Name *\*changed from 1.2 – 1.3\**

Following abbreviations are accepted. The city name must be written fully.

Technical University - TU + City  
University of Applied Sciences - FH + City  
University - Uni + City  
Berufsakademie - BA + City

**If the university uses a shortcut in their proper name this shortcut is acceptable + city.**

**Example:**

*real name:*

Rheinisch-Westfälische Technische Hochschule Aachen -

*proper name:*

RWTH Aachen

### Rule 3.6.3 SAE Logo

Not valid for FSG!

### Rule 3.8 Transponders

Not valid for FSG!

### Rule 4.2.2 Inspection & Testing Requirement

Scrutineers will mark different approved parts (i.e. air restrictor, tires, rims etc.). The car can be disqualified from any dynamic event by using unmarked parts. Parts with broken seals are equivalent to being unmarked.

## Rule 4.2.4 Inspection Process

### Part 4 - weighing

The car will be weighed in ready to race condition. The fuel tank must be filled to the fuel level line (3.5.3.3 Fuel Level Line). The car can be reweighed at any time during the dynamic competitions. There will be a 5,0 kg tolerance. In case of over- or underweight in comparison to the Technical Inspection (Tech Inspection weight +/- 5kg) the team will be penalized with -20 points for each kg additional or missing weight in the Design Event score. (0,1-1kg -> 20 points)

#### Example:

5,3 kg underweight -> 5,3 kg - 5,0kg = 0,3 kg » -20 Points

7,8kg overweight->7,8-5,0=2,8 » -40 Points

In the case of changing broken parts on the car, the car has to be represented at scrutineering and can than be reweighed. It is in the team's responsibility to bring the car for reweighing before entering a dynamic event.  
(kg-kilogram)

## Rule 4.3.3 Scoring

The points for the Cost and Manufacturing Event will be broken down as follows

$\frac{10 \times (P_{\max} - P_{\text{your}})}{(P_{\max} - P_{\min})}$	10 Points	Lowest cost - each of the participating schools will be ranked by total adjusted retail cost from the BOM and given 0-10 points based on the formula on the left. $P_{\text{your}}$ is the adjusted cost of your car and $P_{\min}$ is the adjusted cost of the lowest cost car. $P_{\max}$ is the cost of the most expensive car.
	10 Points	The Cost Report – written, professional presentation of cost data - The report score will be given based on the quality of the cost report, its accuracy and thoroughness. The range for the report score is 0 – 10 points.
	40 Points	Real Case Situation – Teams will receive a task covered a “Real Case in Industry”
	40 Points	Event Day/Visual Inspection - The cars will be reviewed for part content and manufacturing feasibility. The submitted process descriptions will be discussed.
<b>Total</b>	<b>100 Points</b>	

## Rule 4.3.4 The Cost Report

The cost report must be reflective of the **prototype** vehicle that the team has brought to the competition. The cost report shall fit in a ring binder with 8.5”x11” or A4 pages no more than 5” thick.

### *Cost Report Identification*

The cover of the cost rceport must include the following (a) university name, (b) competition name and (c) vehicle number.

### *The Cost Report must consist of the following*

- A cover sheet
- A Table of Contents
- A Cost Summary page listing each section’s cost, and the total vehicle cost

- Eight commodity report sections with the components placed in the sections as specified in Appendix A-3.
- Tabs for each section

*Each commodity report section must include:*

- A Bill of Materials (BOM) for that section, listing end items only, of the prototype that the team has brought to the competition.
- *Up to one page of process description per manufactured or modified part (see below)*
- Receipts.
- Other backup material (prints, photos, et al)

#### *Process Descriptions*

Process descriptions are only done for parts your team made from scratch, or parts that were purchased and modified. Process descriptions are not done for purchased parts. These descriptions explain how a part was manufactured.

#### *Bill of Materials (BOM)*

The BOM must be divided into the eight (8) sections specified in Appendix A-3, and each section must follow the format given in Appendix A-4. The BOM must have the columns as listed in A-4. The columns must be in the order shown in A-4, and there may be no other columns added, nor may any be eliminated. The BOM's are run through a program during judging prior to the event, and reports that do not follow the layout of A-4 will not be scored.

#### *End Items – Definition*

An end item is a part that is bolted onto the car as part of the final assembly process.

#### **Examples:**

A control arm. The control arm is made up of several tubes welded or bonded together, with rod ends threaded to the arm. The parts in the control arm assembly are not included in the BOM. The arm is then bolted to the frame. Thus the control arm is an end item part.

A brake caliper. The caliper is made up of a housing, piston(s), o-rings, nipple, bleeder screw, and a cap. The parts in the caliper assembly are not included on the BOM. The caliper, as it is bolted to the car is an end item.

If your team is unsure if a part belongs as an end item, feel free to ask the Rules Committee. Furthermore, a typical list of end items can be found in the appendix of these rules.

### **Rule 4.3.4.1 General Requirements**

The Cost Report must:

- (A) Reflect the actual, one-off, prototype vehicle brought to the event in terms of specification.
- (B) List and cost every part on the prototype vehicle. This includes any equipment fitted on the vehicle at any time during the competition. The only exceptions are that, per section 4.3.7 of the Rules, the cost of any finish, on-board fire suppression system, rain tyres, or "stand-alone" data acquisition, video or radio system, does not need to be included in the Cost Report.
- (C) Be based on the estimated costs of materials, fabrication and assembly of the car. They costs shall be calculated as defined in Section 4.3.6 of these rules.
- (D) Be based on the actual manufacturing technique used on the prototype, e.g. cast parts on the prototype should be cost as cast, and fabricated parts as fabricated, etc. The reported cost of the

prototype vehicle will exclude capital expenditures (e.g. plant, machinery). *The prototype vehicle's calculated costs are not limited.*

*(E) The reported cost of the prototype vehicle must include the process labour costs (only the process labour costs) for tooling specially manufactured for the parts of the prototype. (e.g. moulds for Carbon Fibre parts, casting moulds etc). The costs must include all processes needed to manufacture the tool(s) (e.g. manufacture positive parts for making the moulds)*

#### **Rule 4.3.4.3 Report Submission and Deadline**

(A) The submitted Cost Report must include both a printed ("hard") copy and an electronic copy of the costed BOM. The uploaded copy must be equal to the FSAE-published version:

<http://students.sae.org/competitions/formulaseries/rules/>

(B) The printed (hard) copy of the report must be on 8 1/2 inch x 11 inch or A4 size paper, using a 10-point font size or larger.

(C) The electronic copy of the BOM must use Microsoft Excel on a CD ROM or USB Stick. It should NOT include copies of receipts or any back-up material.

These reports should be mailed to the address listed in the appendix.

#### **Rule 4.3.4.4 Late Submission of Cost Report**

It is imperative that the cost judges have the Cost Reports in enough time for proper evaluation. Teams that submit reports later than the specified date will be penalized -10 points per working day (Monday till Saturday) late, with a maximum penalty of -80 points. Teams that do not submit a Cost Report will receive -100 points for the Cost & Manufacturing Analysis score.

#### **Rule 4.3.4.6 Cost Report Judging and Penalties**

From the Bill of Material, the cost judges will determine if all parts and processes have been included in the analysis and if unreasonably low costs have been used (determined by the experience of the judges).

*In the case of any omission, error, or cost below reasonable, the teams will lose points for the "Event Day / Visual Inspection" up to a maximum of 40 Points.*

Cost reports that have not made a serious attempt at an accurate cost estimate or that claim to have a cost that is substantially below what the Cost Judges know to be appropriate for cars of this type will be disqualified as unresponsive and will be scored as unsubmitted.

At this discussion, the Cost Judges will:

(A) Review whether the specification of the vehicle in the Cost Report accurately reflects the vehicle brought to the Competition,

(B) Review the manufacturing feasibility of the vehicle

(C) *not valid for FSG*

(D) Judge a 5 min presentation from the Team about a "real case" situation

*The teams will receive a specific task from the cost judges prior the competition. The task will be send via email on the date specified in the Action Deadlines, to the team's responsible person's email*

*address. The team must present their solutions on the competition in a 5 min presentation during the Cost Event. It is a team's decision how they will present the results. Points only will be given for the presented results, not for the presentation.*

The team must present their vehicle at the designated time to the Cost Judges for review of the cost report. Teams that miss their cost appointment will potentially lose all cost points for that day. The schedule for these appointments will be in the registration packets and/or posted on the website.

### **Rule 4.5.10 Judging Sequence**

At Formula FSG, Design Judging will normally involve two parts:

1. Initial judging of all vehicles
2. Final judging ranking the top 4 to 8 vehicles.

### **Rule 5.11.2 Extension Push Bar**

The push bar must be a separate, detachable device. Rear wings will not be accepted as push bar! The push bar must be located behind the rear axle when the car is moved. One fire extinguisher has to be attached to the push bar by a quick release fastener in an easily accessible position.

## **Formula Student Germany Rules**

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### **FSG Rule 1.1 - Registration for FSG**

Registration for FSG must be completed on-line. Online registration must be done by a registered member of the FSG Registration System.

### **FSG Rule 1.2 - First Year Vehicles – FSG**

Only first year vehicles may enter FSG. To be classified as a "first year vehicle" a car must, as a minimum, have a completely new frame. Photographic or other evidence will be used to determine if the frame is new. If there is any question about whether or not the car is in fact a first year vehicle, it will be the sole responsibility of the team to produce such evidence as the organisers or judges may require.

### **FSG Rule 1.3 Second Year Vehicles – FSG**

Vehicles that have competed during any previous Formula SAE competition before August 2006 are prohibited from Formula Student Germany.

### **FSG Rule 1.4 Entries Per University**

Registration for FSG is limited to one (1) vehicle per university.

### **FSG Rule 1.5 FSG Registration Deadline**

Registrations will be accepted in the order in which they are received starting Thursday February 1st, 2007 at 12:00 GMT (13:00 CET!) and ending at 12:00 GMT, April 30th 2007 or when 54 teams have registered, whichever occurs first.

The registration fee must be paid on-line by **PayPal** System at the time of registration. Registration fees may not be paid by any other means. Registration fees are not refundable. There is no late registration and there are no exceptions to this registration policy.

### **FSG Rule 1.6 FSG Registration Fee**

The registration fee of 500 Euros includes 15 team members. Every further team member can be registered for 20 Euros.

### **FSG Rule 1.6 FSG Registration Required Information**

Once the team has officially been registered for FSG online, each team member and faculty advisor is required to add his/her identifying information online. All participants must provide their name, Fisita Organisation membership number, and emergency contact individually. Drivers must provide their government issued highway driver's license number and insurance information.

Participants can only be registered by the team's relevant contact person (who also registered the team; see above) until the 1st of July 2007.

**More Details regarding the Registration Process will be published soon!**

<http://www.formulastudent.de/events/event-2007/registration/>

### **FSG Rule 2.1 FSG Logo**

The FSG logo must be displayed on the front or both sides of the vehicle in a prominent location. FSG logo stickers will be handed out to the teams on site. Diameter of the FSG sticker will be 150 mm.

### **FSG Rule 3.1 Engine running**

Engine running in the pits is not allowed. For testing the engine separate engine running bays will be available in front of the pits.