



Formula Student Combustion
Rules 2012 Version 1.0

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FORMULA STUDENT GERMANY

FSC Rules 2012



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1 Introduction

Since 2010 Formula Student Germany is organizing 2 Events, Formula Student Combustion (FSC) and Formula Student Electric (FSE). Both Events take place at the same dates and the same event site.

This rules document contains the Formula Student Germany rules for the Formula Student Combustion Competition.

2 Important Dates

2.1 Competition Dates and Location

July 31, 2012 to August 05, 2012

Formula Student Germany (FSG) will take place in Hockenheim/Germany.

2.2 Registration

2.2.1 Registration FSC

January 16, 2012 at 1200 CET

Registration forms will be accepted in the order in which they are received, starting January 16, 2012 at 1200 CET and ending on February 27 2012 1200 CEST or when the 78 cars registration limit is reached. Registration will be online at the FSG Website.

2.2.2 Early Registration

January 9, 2012 at 1200 CET

Early registrations will be accepted in the order in which they are received, starting January 9, 2012 at 1200 CET and ending on January 15, 2012 at 1200 CET, or when 30 teams have registered, whichever occurs first.

If all Early Registration Slots are full for one region, additional teams from the same region can register when Official Registration opens on January 16, 2012. All remaining slots that are not used during early registration will then become available for all teams when Official Registration opens on January 16, 2012.

2.3 Structural Equivalency Form

April 02, 2012 at 1200 CEST

IMPORTANT: ALL TEAMS MUST SUBMIT A STRUCTURAL EQUIVALENCY FORM (Appendix A-A). A blank copy of this form is supplied on the Formula Student Germany Website

<http://www.formulastudent.de/fsc/2012/rules/>

The Structural Equivalency Form must be uploaded to the 'My Team' area on the FSG website no later than April 02, 2012 at 1200 CEST.



Late submissions will be penalized with -10 (minus ten) points per day, up to a maximum of -70 points, which will be taken off the team's Total Score.

Teams, which missed the SEF deadline by more than 7 days will be removed from the FSG 2012 competition.

In the event that the FSG Technical Committee requests additional information or calculations, teams have 10 days from the date of the request to submit the requested information. Late submissions will be penalized with -5 (minus five) points per day, up to a maximum of -50 points, which will be deducted from the team's Total Score.

2.4 Impact Attenuator Data

April 02, 2012 at 1200 CEST

IMPORTANT: ALL TEAMS MUST SUBMIT AN FSG IMPACT ATTENUATOR DATA FORM (Appendix A-B). A blank copy of this form is supplied on the Formula Student Germany Website

<http://www.formulastudent.de/fsc/2012/rules/>

Impact Attenuator Data must be uploaded to the 'My Team' area on the FSG website no later than April 02, 2012 at **1200 CEST**.

Late submissions will be penalized with -10 (minus ten) points per day, up to a maximum of -70 points, which will be deducted from the team's Total Score.

Teams, which miss the IAD deadlines by more than 7 days will be removed from the FSG 2012 competition.

In the event that the FSG Technical Committee requests additional information or calculations, teams have 10 days from the date of the request to submit the requested information. Late submissions will be penalized with -5 (minus five) points per day, up to a maximum of -50 points, which will be deducted from the team's Total Score.

2.5 Engineering Design Report and Design Spec Sheet

June 11, 2012 at 1200 CEST

The FSC Engineering Design Report must be uploaded to the 'My Team' area and the FSC Engineering Design Spec Sheet must be filled out online in the 'My Team' area on the FSG website no later than June 11, 2012 1200 CEST.

The FSC Engineering Design Spec Sheet Form can be found on the FSG website in the 'My Team' area prior the deadline. Late submissions will be penalized with -10 (minus ten) points per day, up to a maximum of -100 points, which will be deducted from the team's Engineering Design Event Score. No report submitted will result in a score of zero for the Engineering Design Event.



2.6 Cost Report

June 11, 2012 at 1200 CEST

The Cost Report consists of two parts, a written report and an electronic report. The electronic Cost Report must be submitted as a Microsoft Excel® file. The file must be uploaded to the 'My Team' Area on the HFSGH Website no later than June 11, 2012 at 1200 CEST. The electronic report has to consist of a full vehicle BOM with cost data derived from the Cost Tables and supporting documentation (e.g. calculations, drawing or photos)

The written report must be present at the competition during the Cost Event.

Late submissions will be penalized with -10 (minus ten) points per day, up to a maximum of -80 points, which will be deducted from the team's Cost Event Score. No report submitted will result in a score of zero for the Cost Event.

Note: FSG is currently working on a different solution. It may happen, that the upload format will be changed during the year. FSG announce change via the www.formulastudent.de

2.7 Business Plan Executive Summary

June 11, 2012 at 1200 CEST

The Business Plan Executive Summary must be uploaded to the 'My Team' area on the FSG website no later than June 11, 2012 at 1200 CEST.

Late submission or non-submission will be penalized at the discretion of the judges up to -5 (minus five) points. These penalty points will be deducted from the Presentation Judging Score.

2.8 Fuel Type Order

June 25, 2012 at 1200 CEST

You must inform FSG which type of fuel you will use no later than June 27, 2012 at 1200 CEST.

2.9 Team Member Designation

June 25, 2012 at 1200 CEST

Participating team members must be designated prior to the event. To designate a team member, please visit "My team area" on the FSG Website.

Team members can only be designated as FSC participants if they have entered the following personal information in their user profiles:

- Personal Address (required for insurance purposes)
- ZIP code (required for insurance purposes)
- City (required for insurance purposes)
- Clothing size (required for Event T-Shirts)



- Emergency contact person (e.g. parents)
- Emergency contact phone (e.g. parents)
- FISITA organisation you belong to
- FISITA organisation member number
- JPG Copy of their Health Insurance Certificate or copy of insurance conformation letter (not older than 1 year)
- Name of the Health Insurance Company
- Health Insurance Certificate period of validity
- Current Target Degree of Study

In case the health insurance data of one or more team members is missing or incorrect, FSG will decline the designation of the team member(s) in question. Only designation of team members with complete and correct health insurance information will be accepted.

Team members that were declined can be registered again after their health insurance data has been corrected for an additional processing fee of 50 Euro.

2.10 Scrutineering Quiz

May 07, 2012 at 1200 CEST

Participating teams have to complete the Scrutineering Quiz. The scrutineering order at the event will be based on the time a team needs to complete the quiz. The fastest team will receive the first slot, the slowest team will receive the last slot. Teams that do not participate in the quiz will be sorted by registration order and will be placed at the very end of the scrutineering queue behind the slowest team to complete the quiz. The Quiz will include questions about the 2012 Rules and the 2012 FSG Event Handbook.

FSG has the right to reorder the scrutineering queue, in case the scrutineering slot of a team coincides with a time slot of the team for a static event

2.11 Vehicle Status Video and Vehicle Status Report

July 09, 2012 at 1200 CEST

All teams must upload a video showing the car running under his own power prior the competition.

The Vehicle Status Video and Vehicle Status Report must be uploaded to the 'My Team' area on the FSG website no later than July 09, 2012 at 1200 CEST.

The video must between 15 seconds and 30 seconds long, showing the car from a 3rd person view. During the video the car must be viewable in side view. Running the car with bodywork is not necessary, but strongly recommended.

Teams how can not upload a video of the running car must hand in a Vehicle Status Report. This report must include:



- Written status of the car
- Photos of the car in the actual assembly status
- List of all major components of the car, status of the components and photos of the components
- Reason for delay and project plan to finish the car prior the competition

FSG organizers will check each of the Vehicle Status Videos and Vehicle Status Reports.

Teams who hand in a Vehicle Status Report must answer all questions from the organizers within 72 hours. Teams, which missed the Vehicle Status Video / Vehicle Status Report deadline will be removed from the FSG 2012 competition. Missing the 72 hour deadline for answering questions of the organizers will be comparable to non submission.

Video File format: mp4 / h.264, in a .zip folder / up to 1080p / max file size 20MB

Report File format: pdf / max. file size 5MB

3 General

3.1 FSC 2012 Rules

The Formula Student Germany Combustion (FSC) competition will comply with the Formula SAE® 2012 rules, located here:

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

Formula Student Germany does have some specific rule changes and additions. Those changes and additions are located within this document, which supersede the specific sections of the published Formula SAE® rules for 2012.

3.2 Rules Questions

Any questions or ambiguities concerning the rules for Formula Student Germany will be resolved by the Formula Student Germany Rules Committee. You may contact the FSG Rules Committee, here:

rules@formulastudent.de

Any question must use following format in the subject line:

UNINAME_RULESNUMBER

Each Request must give following informations in the end

Name / Surname / University

Attachments must be in *.jpg or Adobe ® *.pdf format. Any other file format will not be accepted. The maximum Email size limit is 5 MB.

3.3 Official Language

The Formula Student Germany Official Language is English only.



3.4 Official Time

The Formula Student Germany Official Time

From	Till	Time
30.10.2011	24.03.2012	CET
25.03.2012	28.10.2012	CEST

To convert CET or CEST to your local time you may use following website:

<http://www.timeanddate.com/worldclock/converter.html>

3.5 FSC Registration

3.5.1 FSC Registration Deadline

The registration deadline for Formula Student Germany is listed in the Important Dates section of this document. (Please refer to FSG Rules, section 2.2)

3.5.2 FSC Registration Capacity Limit

Registrations will be given out, in the order in which they are received. The 2012 FSC competition will be limited to a total of 78 competing teams.

3.5.3 FSC Early Registration for Formula Student Germany 2011 Top Ten Overall Finishers

10 registration slots will be available for the FSC 2011 Top Ten overall finisher teams.

Place	Team
1	Ravensburg DHBW
2	München TU
3	Stuttgart U
4	Helsinki UAS
5	Rochester IT
6	Hamburg UAS
7	Hatfield UH
8	Ann Arbor U MI
9	Karlsruhe KIT
10	Esslingen UAS

3.5.4 FSG Early Registration allowed for FSC 2011 “Media Award” Winner

One registration slot will be available for the Team which won the FSC 2011 Media Award.

Team
University of Pisa

3.5.5 FSC Early Registration for TOP 10 World Ranking Teams

10 (ten) registration slots will be available for the World Ranking Top 10 (Ten) teams. The Top 10 ranking which is valid on the day when early registration starts will count. The World Ranking can be found here:

<http://www.fs-world.org> .



3.5.6 FSC Early Registration for International Teams

16 registration slots will be available for Overseas Teams and non-German, European teams before Official Registration starts. These 16 slots are split into 4 regions as follows:

Region (For Definition of Regions see Appendix A)	Number of Slots
Australasia, China and Japan	3
Europe (beside Germany)	5
North America	4
Rest of the world beside Europe	4

Definition of the regions can be found in the FSG Rules, Appendix A.

3.5.7 FSG Registration Fee

The registration fee of 750 Euros is for one 20-person team. More team members can be registered for 20 Euros per each additional team member. There is no limit to team size.

The registration fee must be paid on-line by PayPal within 72 hours of registration. Registration fees may not be paid by any other means. Registration fees are not refundable for any reason. There is no late registration and there are no exceptions to this registration policy.

3.5.8 FSG Registration Required Contact Information

Once the team has officially been registered for FSG, each team member and faculty advisor is required to add his/her identifying information online. All participants must provide their name, individual emergency contact information, current target degree of study and health insurance informations.

Participants may only be added (registered) by the team's official contact person (the person who registered the team for the event) until June 25, 2012 at 1200 CEST.

3.5.9 Society Membership

Every participating team member must be a member of one of the FISITA (www.fisita.org) engineering societies.

3.5.10 Student Status

Students with a current target degree PhD/PhD Students or equal can not participate at FSG.

3.5.11 Faculty Advisor

FSG strongly recommends that all participating teams have a Faculty Advisor present with them at all times, during the competition. In the case of having no Faculty Advisor present during competition, the Team Captain will take over all responsibilities as the acting Faculty Advisor.

3.5.12 FSG First Year Vehicles

FSG only accepts first year vehicles. A "first year vehicle" must have at least a completely new frame, which shows significant design changes compared to the vehicle used the year before.



It will be the team's responsibility to produce evidence of significant design changes in case of a request by any FSG judges or organizers.

4 Vehicle Requirements and Restrictions

4.1 Alternative Frame Rules

Alternative Frame Rules are allowed for FSC 2012. Teams must submit their Request by December 31st 2011 to following Email address AF-Rules@Formulastudent.de . Teams must follow the Formula SAE® AF Rules.

4.2 CFRP space frame chassis

Using CRFP tubes in the Primary Structure is not permitted.

4.3 Impact Attenuator

4.3.1 Impact Attenuator Design (Specific FSG change of Formula SAE® 2012 Rule B 3.20.1)

Additional to Formula SAE® 2012 Rule B 3.20.1 requirements Impact Attenuators must have a front closed front section

Quasi-static testing is not allowed. Only dynamic tests (drop down, sledge or pendulum test) are allowed.

4.3.2 Anti Intrusion Plate (Specific FSG change of Formula SAE® 2012 Rule B 3.20.6)

On all cars, a 1.5 mm (0.060 in) solid steel or 4.0 mm (0.157 in) solid aluminium "anti-intrusion-plate" must be integrated into the Impact Attenuator. Alternative materials are prohibited.

The anti intrusion plate must be installed at the test and must show that the maximum deflection is not more than 25,4mm. A simulation of the deflection is not sufficient.



4.4 Engine Lubrication System

The lowest point of the engine lubrication system must be no lower as the line between the lowest point of the main roll hoop and the lowest frame rail behind the engine and/or lubrication system. If the engine oil sump or any other part of the lubrication system is lower than the this line (figure 1), it must be protected by an sufficient skid plate, or frame tubes installed longitudinally under affected part of the engine lubrication system.

The engine lubrication system must be protected from surface contact in any situation while in operation on

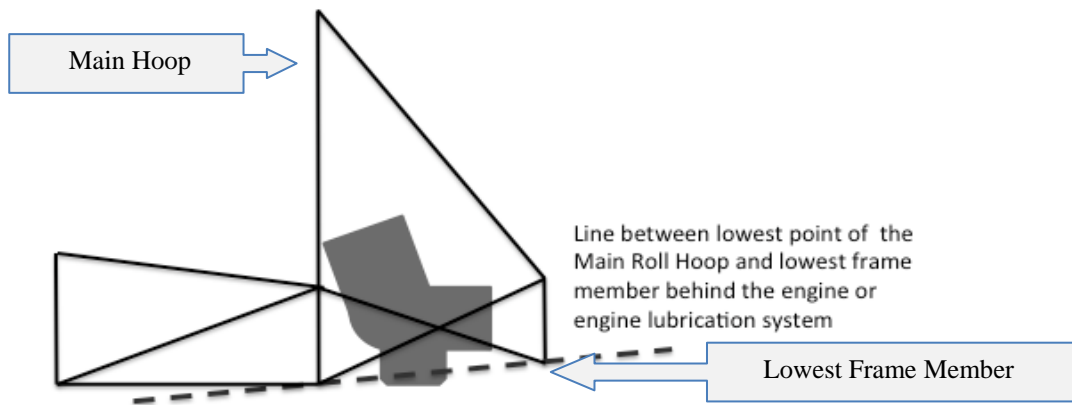


Figure 4 Skid Plate position

track, especially in the event of a suspension failure.

4.5 Fuel System

4.5.1 Refueling

Re-fueling must be able to be accomplished without the removal of any body parts of the car.

4.5.2 Fuel Lines and Connectors (Specific FSG change of Formula SAE® 2012 Rule B 8.8.1)

Fuel lines and hoses made from PTFE (Polytetrafluoroethylene) are prohibited.

The use of plastic quick release connectors and plastic fittings located between the fuel tank and the engine (supply and return) are not permitted.

4.5.3 Fuel Rails (Specific FSG change of Formula SAE® 2012 Rule B 8.9)

The use of fuel rails made from plastic, carbon fibre or rapid prototyping flammable materials is prohibited.

4.5.4 Ventilation of Enclosed Structures (Specific FSG change of Formula SAE® 2012 Rule B 9.7.3)

Enclosed monocoque structures, undertrays or skid plates designed to protect the engine or tanks carrying liquids; must have at least 2 (two) holes (each a minimum of 50 mm in diameter). These holes must be positioned in the lowest part of the structure in such a way as to positively prevent accumulation of volatile liquids and/or vapours.



4.5.5 Fuel (Specific FSG change of Formula SAE® 2012 Rule B 9.1)

The fuels provided at FSC 2012 are expected to be 98 octane (ROZ 98) gasoline and E-85. This is subject to change.

4.6 Electrical System

4.6.1 Brake Over-Travel Switch (Specific FSG change of Formula SAE® 2012 Rule B 7.3.3)

The Brake Over-Travel switch must be a mechanical single pole, single throw (commonly known as a two-position) switch (push-pull or flip type) as shown in figure 2.

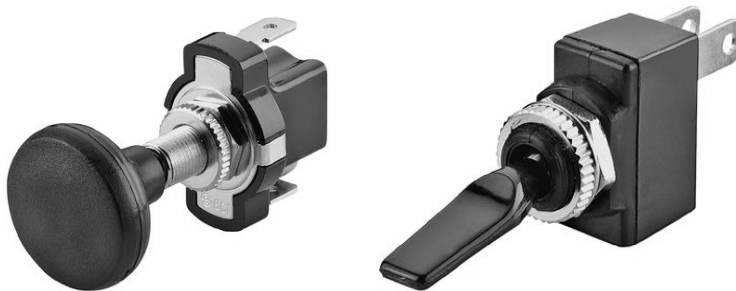


Figure 2 – example of allowed switch types for the brake over-travel switch

4.6.2 Brake light (Specific FSG change of Formula SAE® 2012 Rule B 7.4.1)

The car must be equipped with one red brake light. The brake light itself has to have a black background and a rectangular, triangular or near round shape with a minimum shining surface of at least 15cm² be positioned in the lowest part of the rear in very bright sunlight.

4.7 Driver Egress (Specific FSG change of Formula SAE® 2012 Rule B 4.8)

The driver egress, required by Formula SAE® 2012 Rule B 4.8 must be possible in all steering wheel positions.

4.8 Fire Extinguishers (Specific FSG change of Formula SAE® 2012 Rule B 17.14)

Aqueous Film Forming Foam (AFFF) fire extinguishers are prohibited.

4.9 Vehicle Identification

4.9.1 School Name (Specific FSG change of Formula SAE® 2012 Rule B 16.2)

The following school type abbreviations are accepted. The city name must be written fully.

Technical University - TU + City

University of Applied Sciences – UaS + City

University - Uni + City

Berufsakademie - BA + City

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

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Example:

Real name: Rheinisch-Westfälische Technische Hochschule Aachen -

Acceptable shortcut name: RWTH Aachen

4.9.2 Transponders (Specific FSG change of Formula SAE® 2012 Rule B 15.2)

Transponders will be provided by FSG. Only FSG provided Transponders will be acceptable for use at FSG.

4.10 Technical Inspection Sticker Space (Specific FSG change of Formula SAE® Rule B16.4)

The technical inspection sticker will be placed on the nose of the car directly in front of the cockpit opening. A space 75 mm tall x 150 mm wide must be made available for this sticker.

4.11 Drivers Underclothing (Specific FSG change of Formula SAE® 2012 Rule B 17.6)

All drivers have to wear underwear ((long pants and long sleeve t-shirt) certified to SFI 3.3 or FIA 8856-2000



5 Pit Rules

5.1 Power during pushing

The car must be able to be pushed around with the Primary Master Switch in the OFF position.

5.2 Push Bar (Specific FSG change of Formula SAE® 2012 Rule D13.2)

The push bar must be a separate, detachable device. Rear wings will not be accepted as a 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 mechanism in an easily accessible position.

5.3 Engine running in the pits

Running of engines is not allowed in the pits or the garage areas. There is a designated, supervised, engine running area for this purpose. All engine running is to be conducted in the designated engine running area only. Engine running is allowed only during the active hours of competition. No engines are to be run under any circumstances between the hours of 2000 to 0800.

5.4 Quick Jack

Each team must present a quick jack to lift up the car by using the jacking point during Technical Inspection. The quick jack must be able to lift up the rear end of the car, so that the drive wheels are at least 10.2 cm (4 in) off the ground.

5.5 Tire and Rim Combination

During scrutineering each team needs to present tires for dry condition and tires for wet conditions. All dry tires have to have the same manufacturer, size and compound. All wet tires have to have the same manufacturer, size and compound.

The tire model /rim model combination presented during scrutineering must be the same during the whole event. The rims for dry tires and wet tires can be different.



6 SEF and IAD Documents

6.1 Structural Equivalency and Structural Equivalency Form

All teams must submit the FSG Structural Equivalency Form (Appendix A-A). A blank copy of this form is supplied on the Formula Student Germany Website

<http://www.formulastudent.de/fsc/2012/rules/>

The use of alternative materials or tubing sizes to those specified in Formula SAE® 2012 Rule B 3.3.1 “Baseline Steel Material” is allowed, provided they have been judged by a technical review to have equal or superior properties to those specified in Formula SAE® 2012 Rule B 3.3.1 “Baseline Steel Material”.

Structural equivalency must be demonstrated by providing calculations and/or tests results

All formula symbols and abbreviations, used in the SEF, must be defined.

6.2 Impact Attenuator Data

All teams must submit the FSG Impact Attenuator Data Form (Appendix A-B), along their test results, description of the test setup, the used test equipment and photo documentation of the IAD before and after the test. The Impact Attenuator Data must be submitted no later than the specified date.

A blank copy of this form is supplied on the Formula Student Germany Website

<http://www.formulastudent.de/fsc/2012/rules/>

7 Technical Inspection

7.1 Inspection & Testing Requirement

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

7.2 Car Weighing

All cars will be weighed prior to Engineering Design Judging. All cars are to be weighed in ready to race condition. The fuel tank must be filled to the fuel level line. All lubricants and coolants must be in the car. This weight will be the car’s Official Technical Inspection weight. There will be a penalty if the car weight changes during Dynamic Competition. The allowable weight tolerance is ± 5.0 kg. In the case of overweight or underweight in comparison to the Technical Inspection weight, the team will be penalized -20 (twenty) points for each kg (or portion of a kg) of additional or missing weight. This point penalty will be deducted from the Engineering Design Event score. (Each 0.1 to 1.0 kg = -20 points)

Example:

If the car is 5.3 kg underweight: 5.3 kg minus the 5.0 kg tolerance = 0.3 kg equals -20 Points

If the car is 7.8 kg overweight: 7.8 kg minus the 5.0 kg tolerance = 2.8 kg equals -60 Points



If the car weight changes due to replacement of broken parts, the car must be presented for tech inspection and then re-weighed. It is the team's responsibility to have the car re-weighed before entering a dynamic event after changing parts.

8 Dynamic Events

8.1 Dynamic Events and Maximum score (Specific FSG change of Formula SAE® 2012 Rules Part D Article 1)

Skid Pad	75
Acceleration	75
Autocross	100
Fuel Efficiency	100
Endurance	325
Total	675

8.2 Skid Pad Scoring (Specific FSG change of Formula SAE® 2012 Rule D 6.8.3)

The following equation is used to determine the scores for the skid-pad event:

$$Skidpad\ Score = 71,5 \times \frac{\left(\frac{T_{max}}{T_{your}}\right)^{-1}}{\left(\frac{T_{max}}{T_{min}}\right)^{-1}} + 3,5$$

Where

T_{your} is the average of the left and the right timed laps on your best run including penalties.

T_{min} is the elapsed time of the fastest car

T_{max} will be 1.25 times T_{min} .

8.3 Autocross Scoring (Specific FSG change of Formula SAE® 2012 Rule D 7.8.1)

The following equation is used to determine the scores for the autocross event:

$$Autocross\ Score = 95,5 \times \frac{\left(\frac{T_{max}}{T_{your}}\right)^{-1}}{\left(\frac{T_{max}}{T_{min}}\right)^{-1}} + 4,5$$

Where:

T_{min} is the lowest corrected elapsed time recorded for any competitor in either heat

T_{max} is 125% of T_{min}

T_{your} is the lowest corrected elapsed time in either heat for the team being scored.



8.4 Endurance Scoring (Specific FSG change of Formula SAE® 2012 Rules D8.19.2)

The following equation is used to determine the scores for the endurance event:

$$Endurance\ Score = 275 \times \frac{\left(\frac{T_{max}}{T_{your}}\right)^{-1}}{\left(\frac{T_{max}}{T_{min}}\right)^{-1}} + 50$$

Where:

T_{min} will be the lowest corrected time of the fastest team of the event.

T_{your} will be the combined corrected times of both of your team’s drivers in the heat.

T_{max} will be 1.333 times T_{min} .

If $T_{your} > T_{max}$: Endurance Score = 25 (twenty five) Points

8.4.1 Fuel Efficiency Scoring (Specific FSG change of Formula SAE® 2012 Rule D 8.22 and D 8.25)

The following equation is used to determine the scores for the fuel efficiency event:

$$Efficiency = 100 \times \frac{\left(\frac{EfficiencyFactor_{min}}{EfficiencyFactor_{your}}\right)^{-1}}{\left(\frac{EfficiencyFactor_{min}}{EfficiencyFactor_{max}}\right)^{-1}}$$

$$Efficiency\ Factor = \left(\frac{T_{min} I\ lap_{total}}{T_{yours} I\ lapyours}\right) \times \left(\frac{V_{min} I\ lap_{total}}{V_{yours} I\ lapyours}\right)$$

Where:

V_{min} is the smallest volume of fuel used by any competitor, whose fulfil $T_{your} < 1.333 \times T_{min}$

V_{your} is the volume of fuel used by the team being scored. Vehicles whose fuel volume exceeds 26 liter/100km, will receive zero (0) points for fuel efficiency.

T_{min} will be the lowest corrected time of the fastest team of the event, whose fuel volume will not exceeds 26 liter/100km.

T_{your} will be the combined corrected times of the drivers in your heat. Vehicles whose corrected time exceeds 1.333 times the corrected time of the fastest team, will receive zero (0) points for fuel efficiency.

Lap_{yours} will be the number of driven laps, at least 50% of the total endurance distance. The car must re-enter the track after the driver change.

Lap_{total} will be the number of the full endurance distance.

9 Static Events

9.1 Business Plan Presentation (75 Points)

9.1.1 Executive Summary

Judging will start with an Executive Summary before the FSG Competition. The principal document submitted prior to the Business Plan Presentation is an Executive Summary. The Executive Summary must not exceed one (1) page, team name and car number must be written on the Executive Summary. The Executive Summary should contain a brief description of the team’s Business Plan. In the Summary



the two most outstanding technical features of the car should be listed. The Summary has to include the anticipated production cost, per vehicle, in a production run of 1000 cars per year (value from Cost Report).

The Executive Summary must relate to the specific prototype car entered in the FSG competition. The costs of the prototype car entered will not be considered as part of the Business Plan judging.

Even though the Executive Summary is only judged by the presentation judges, all Engineering Design and Cost judges will have access to the file and may refer to it.

The Executive Summary must be submitted in Adobe Acrobat® format (*.pdf file) online, no later than the specified date. (Please see FSG Rule section 2.7)

Late submission and non submission will be penalized. It is at the discretion of the judges to deduct between -5 (minus five) points from the Presentation Judging score. The penalty points will be deducted from your final Business Plan Presentation Score.

Note: Consider your Executive Summary to be the first impression of your Business Plan to the Executive Board of a major auto manufacturing company.

9.1.2 Deep Dive Topic

After submission of the Executive Summary the teams will receive a specific Deep Dive Topic from the presentation judges prior the competition. The task will be sent via email on the date specified in the Action Deadlines, to the team's responsible person's email address.

Every team has to present this special Deep Dive Topic as a part of the team's business plan presentation to the judges.

NOTE: A team should not describe only this Deep Dive Topic in the business plan presentation. It's important that a team presents a good business plan as well.

9.1.3 Data Projection Equipment

Video projectors / video monitors will be provided by Formula Student Germany. These projectors will have VGA input connectors.

The organizers will not provide any other presentation equipment needed. Teams planning to use other presentation equipment, as a part of their presentation, are responsible for bringing, or otherwise arranging their own equipment.

Judging Sequence at Formula Student Germany the Business Plan Presentation Judging will consist of two parts:

Initial judging of all teams

Final judging ranking the top 3-5 teams



9.1.4 Scoring Formula

The scoring of the event is based on the average of the two or three presentation judging forms. There is a maximum of seventy-five (75) points from the FSG Presentation Judging Form.

Non finalist:

$$\text{PRESENTATION SCORE} = 70 \times (P_{\text{your}}/P_{\text{max}})$$

Where:

“P_{max}” is the highest score awarded to any team not participating in the finals

“P_{your}” is the score awarded to your team

Finalists:

1st Place 75 points

2nd Place 74 points

3rd Place 73 points

4th Place 72 points

5th Place 71 points

It is intended that the scores will range from near zero (0) to seventy-five (75) to provide good separation. The Presentation Event Captain may at his/her discretion; normalize the scores of different judging teams.

9.2 Engineering Design Event (150 Points)

9.2.1 Judging Sequence

At Formula Student Germany Engineering Design Judging will consist of two parts:

Initial judging of all vehicles

Final judging ranking

9.2.2 Engineering Design Report Files - File Format and Size

The Engineering Design Report must be submitted in Adobe Acrobat® format (*.pdf file) online, no later than the specified date. (Please see FSG Rule, section 1.5) The size of the document must not exceed 5MB. A responsibly sized document will be much smaller than 5MB in file size. Please ensure that photos within the Acrobat file are of an appropriate resolution.

Engineering Design Spec Sheet. File Format and UnitsThe FSG Engineering Design Spec Sheet must be filed online, no later than the specified date. (Please see FSG Rule, section 2.5) The Formula Student Germany Engineering Design Spec Sheet can be found on the FSG website under YOUR TEAM AREA prior the deadline.

The form is for metric units only.

9.2.3 Penalty for late submission

Penalties for late/non submission of the Engineering Design Reports and/or Engineering Design Spec Sheets is as follows:



Late arrival of one or both documents: -10 (minus ten) points for each day, up to a maximum penalty of -100 points.

Failure to submit one or both documents will automatically result in zero points for the Engineering Design Event.

The penalty points will be deducted from your final Engineering Design Scores. The minimum allowable Engineering Design Score will be 0 Points.

9.3 Cost Event (100 Points)

9.3.1 Cost Event Scoring (Specific FSG change of Formula SAE® 2012 Rule C 3.7)

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

$20 \times \frac{\left(\frac{P_{max}}{P_{your}}\right)^{-1}}{\left(\frac{P_{max}}{P_{min}}\right)^{-1} \times \left(\frac{P_{your}(Visual\ Inspection)}{40}\right)}$	20 Points	<p>20 Points lowest cost - each of the participating schools will be ranked by total retail cost from the BOM multiplied with a quotient of P_{your} (visual inspection) and 40 (maximum points for visual inspection) and given 0-20 points based on the formula on the left.</p> <p>P_{your} is the cost of your car and P_{min} is the cost of the cheapest car.</p> <p>P_{max} is the cost of the most expensive car.</p> <p>P_{your} (visual inspection) are your points for the visual inspection. 40 points are the maximum score for visual Inspection</p>
	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.
Total	100 Points	



9.3.2 Late submission of Cost Report (Specific FSG change of Formula SAE® 2012 Rule C 3.1)

Teams that submit reports later than the specified date will be penalized -10 (minus ten) points per day, up to a maximum penalty of -80 points. Teams which do not submit a Cost Report will receive 0 (zero) points for the Cost & Manufacturing Analysis score. Minimum Event score is 0 (zero) points.

9.3.3 Addenda (Specific FSG change of Formula SAE® 2012 Rule C 3.16.)

For changes in your corrections made after the submission of the cost report please use the FSAE cost addendum form given in FSAE Rules Appendix E. For all new parts, which are manufactured, a drawing must be attached to the addendum form.

9.3.4 Cost Report Penalties Process (Specific FSG change of Formula SAE® 2012 Rule C 3.17)

Only penalty method A will be used for FSG, described in Formula SAE® 2012 Rule C 3.18 “Penalty Method A – Fixed Point Deductions”. The Formula SAE® 2012 Rule C 3.19 “Penalty Method B – Adjusted Cost Deductions” is not valid for the FSG competition.