



INDEX

A	ADMINISTRATIVE REGULATIONS	2
A1	Formula SAE Overview and Competition	2
A2	The 2017-2018 Formula SAE Series	2
A4	Individual Participation Requirements	2
A5	Faculty Advisor, Electrical System Officer and Electrical System Advisor	2
A6	Vehicle Eligibility	3
A7	Registration	3
A8	Vehicle Documentation, Deadlines and Penalties	8
	APPENDIX A-2: PAYMENT DETAILS AND INVOICE	14
	APPENDIX A-3: CAMPING	15
T	GENERAL TECHNICAL REQUIREMENTS	16
T3	Driver's Cell	16
T5	Drivers Equipment (belts and cockpit padding)	17
T6	General Chassis Rules	19
T7	Brake System	19
T8	Powertrain	20
T9	Aerodynamic Devices	20
T11	Fasteners	20
T14	Equipment Requirements	22
IC	INTERNAL COMBUSTION ENGINE VEHICLES	23
IC1	Internal Combustion Engine Powertrains	23
IC2	Fuel and Fuel System	23
IC4	Electrical System and Shutdown System	24
EV	TECHNICAL REGULATIONS - ELECTRIC VEHICLES	25
EV1	Electric System Definitions	25
EV3	Tractive System - Energy Storage	25
EV4	Tractive System – General Requirements	26
EV5	Shutdown Circuit and Systems	26
D	DYNAMIC EVENT REGULATIONS	27



Formula SAE Italy & Formula Electric Italy 2018

Information & Rules

A ADMINISTRATIVE REGULATIONS

A1 Formula SAE Overview and Competition

The 14th edition of the Formula SAE Italy & Formula Electric Italy 2018 will take place at the "Riccardo Paletti" Circuit in Varano de' Melegari (PR) on July 11-15, 2018.

Formula SAE Italy & Formula Electric Italy 2018 will follow the "[2017-18 FSAE Rules](#)", with the exceptions and additions listed below and use the FSAE scoring methods.

A2 The 2017-2018 Formula SAE Series

A2.4 Official Announcements and Competition Information

A2.4.1 Formula SAE Italy & Formula Electric Italy 2018 news will be provided to students in following forms of media:

- Emails to registered team leaders
- Press releases published on-line on Formula ATA website

A4 Individual Participation Requirements

A4.3 Society Membership

Team members must be members of at least one of the following societies: (1) SAE International, (2) SAE Australasia, (3) SAE Brazil, (4) IMechE, (5) VDI, or (6) JSAE.

Furthermore, in case of teams coming from nations which have FISITA member Association they can choose to subscribe to their national association.

Proof of membership, such as membership card, is required at the competition.

A5 Faculty Advisor, Electrical System Officer and Electrical System Advisor

A5.1 Faculty Advisor

A5.1.4 Faculty Advisor must be present at the event for all the time. In case the Faculty Advisor will be not able to attend, the organizers will accept only a staff representative of the University.



A5.1.5 The Faculty Advisor will have to communicate his/her absence and/or any other changes by sending official letter with University head paper by **June 21, 2018**.

A5.2 Electrical System Officer - Electric Teams only

A5.2.1 Every participating team has to appoint one to four ESOs for the competition.

A5.2.9 ESO is not required for Class 3. In case no ESO is appointed, then team is not allowed having any accumulator container at the event site.

A5.3 Electric System Advisor - Electric Teams only

A5.3.8 ESA is not required for Class 3.

A6 Vehicle Eligibility

A6.8 First Year Vehicles: Class 1

A6.8.1 To be classified as a "first year vehicle" a car must, as a minimum, have a completely new frame or monocoque. Photographic or other evidence will be used to determine if the frame is new.

A6.8.2 If there are any questions 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 organizers or judges may require.

A6.9 Second Year Vehicles: Class 1

A6.9.1 Second year vehicle are not admitted.

A6.10 First Year Vehicles: Class Driverless

A6.10.1 Being the first year of Driverless Event in Formula SAE Italy, all vehicles attending to 2018 edition are classified as "first year vehicle" no matter their construction year.

A6.11 Design review category: Class 3

A6.11.1 Teams that participate in the "Design review category" will be admitted to the Design, Presentation and Cost events.

A6.11.2 A static presentation of the car, or part of it, can be conducted in order to better explain the project.

A6.11.3 A separate classification will be reserved for this category.

A6.11.4 Design, Presentation and Cost events follow the rules as per Class 1. In particular the Cost Report must contain an estimation of the cost of the actual car.

A6.11.5 Class 3 electric vehicles are not allowed to activate tractive system at the event site.



A7 Registration

A7.1 Registration

Registration for Formula SAE Italy & Formula Electric Italy 2018 is made into two phases: *early registration* for reserved slots and *main registration* for all teams.

Reserved registration slots

The first 3 Class 1C teams, the first 3 Class 1E and the first 2 Class 3 classified teams at the Formula SAE Italy & Formula Electric Italy 2017 will have a granted *early registration* slot in 2018 event:

Class 1C

- PWR Racing Team - Wroclaw University of Science and Technology (Poland)
- Dynamis PRC – Politecnico di Milano (Italy)
- Herkules Racing Team – University of Kassel (Germany)

Class 1E

- DHBW Engineering Stuttgart - DHBW Stuttgart (Germany)
- Global Formula Racing - DHBW Ravensburg (Germany)
- Squadra Corse – Politecnico di Torino (Italy)

Class 3

- Race Up Electric – Università di Padova (Italy)
- Firenze Racing Team - Università di Firenze (Italy)

After *early registration* closure, no slot will be granted for these teams.

Further ten *early registration* slots will be granted for North and South America Australia and rest of the world (non-European) teams.

Slots that are not allocated for *early registration* will become available for all teams during *main registration* period.

Registration must be completed on-line per electronic form that will be available on the event website in each registration period. The registration will be confirmed only when the due amount is credited on the ANFIA bank account.

Formula SAE Italy & Formula Electric Italy will grant 3 registration slots to the 2018 event to the first 3 Class 1C and the first 3 Class 1E classified Teams of this year event and 2 slots to the first 2 Class 3 classified Teams.



A7.2 Entries per University - FSAE-I Competition - Registering IC and EV Teams

For the purposes of registering and competing, a school IC team and EV team are considered separate and independent entities. A university may register both an IC Team and an EV team in the same competition.

A7.3 Registration Limits

The Formula SAE Italy & Formula Electric Italy 2018 will admit 85 teams in Class 1, 10 teams in Class Driverless and 5 teams in Class 3 with following criteria:

- 60 Class 1C - IC Engine
- 25 Class 1E - Electric Propulsion System
- 10 Class Driverless
- 5 Class 3 teams (both IC and Electric)

A7.4 Registration Dates

Early registration for the Formula SAE Italy & Formula Electric Italy 2017 will open on **January 15th, 2018 at 10 AM CET (GMT+1)** and will close on **January 16, 2018 at 1:00 PM CET (GMT+1)**.

Main registration for the Formula SAE Italy competitions will open on **January 17, 2018 at 10:00 AM CET (GMT+1)** and will close on **February 26, 2018 at 1:00 PM CET (GMT+1)**.

Main registration is based on first come, first serve basis. The list of registered teams will be online right after forwarding.

A7.5 Registration Fees

A7.5.1 Teams will have 48 hours, starting from registration time, to send us the proof of the bank transfer, certifying the payment date and time:

Class 1C, 1E: € 1.300,00 + 22% VAT = **€1.586,00**

Class 3: € 900,00 + 22% VAT = **€1.098,00**

Class Driverless € 1.300 +22% VAT = **€1.586,00**

A7.5.2 Registration fees are not refundable and are not transferred to a subsequent year's competition.

A7.5.3 The registration fee includes 25 team members. Additional team member/guest can be registered by paying an extra fee of € 28,00 + 22% VAT = € 34,16 by **May 10, 2018** with bank transfer (See Appendix A-2 for further information).

A7.5.4 ATM/Guest form is available [here](#)



A7.6 Waitlist

A7.6.1 There will be no waiting list.

After closure of main registration or when registration limits have been reached, no further team will be registered for the event, even in case of withdrawals.

A7.7 Withdrawals

A7.7.1 Registered teams that won't be able to attend the competition are requested to officially withdraw not later than **June 6, 2018**, by notifying the following e-mail:

- **formula.sae@ata.it** for combustion teams
- **formula.ei@ata.it** for electric teams

A7.8 Italy Visas

Teams requiring visas to enter Italy are advised to upload on event website the [list of team members](#) with their passports numbers, the arrival and departure dates by **May 30, 2018**.

Late requests will be not considered.

ANFIA will provide your team an official invitation letter, which can be used for your VISA application.

Teams that need VISA are advised to apply for it as soon as possible and to refer to the Italian VISA rules to determine the VISA requirements and applications.

ANFIA will not send personal letters or contact directly the Italian Embassies or Consulates for your team participation in the event. VISA information about required documentation can be found on the Italian Ministry of Foreign Affairs and International Cooperation's website at <http://vistoperitalia.esteri.it/home/en>.

A7.9 Vehicle Shipping

Vehicle shipments by commercial carrier must comply with the laws and regulations of nations from which, and to which, the car is being sent. Teams are advised to consult with their shipping company or freight forwarder to be sure their shipment fully complies with all relevant, customs, import/export and aviation shipping requirements.

Shipments must be sent with the sending team or university listed as the receiving party. Neither the competition organizers nor the competition site (Riccardo Paletti Circuit) can be listed as the receiving party.

Stick labels on crates/containers which must have the below receiving address permanently and clearly marked:



Receiving address

University and/or team name

Car number: 000

c/o Formula SAE Italy & Formula Electric Italy 2018

Autodromo Riccardo Paletti

Strada per Fosio 1

44030 Varano de' Melegari (PR) – Italy

Shipping documents All shipping documents and custom clearances must be completed and supplied by the University and/or Team.

Damage Damage to the shipment is the sole responsibility of the University/Team. Be aware that the crates/containers will be stored outdoor without any shelter.

Team contact Please communicate to organization names and mobile numbers of at least two persons, which likely are the Team Leader and the Faculty Advisor, to be contacted in case of problems.

Delivery and collections dates

- Delivery: Tuesday 10 or Wednesday 11, 2018 from 9:00 AM to max 6:00 PM;
- Collection: **the maximum date to pick up your car will be:** Monday 16, or Tuesday 17, 2018 from 9:00 AM to max 6:00 PM.

Forklift service for loading and unloading cars will be only available on these dates. Out of these days, its availability and use is not guaranteed and, in case, team should bear the cost.

Crates/containers must have a low access for fork lift maneuver. Crating and uncrating is the sole responsibility of the team.

A7.11 Car Number

When choosing your car number, please consider the numbering listed here below:

Combustion cars

- From 1 to 59
- From 70 to 99

Electric cars

- From 100 to 159
- From 170 to 199

Class 3 teams

- From 300 to 399



Class Driverless

- From 700 to 759
- From 770 to 799

Take note that it could be already taken by another team. The acceptance order will follow the registered team list published in the ATA web site.

In that case, you will receive an e-mail message asking for a new choice.

If a team decides to change the participation class (Class 1 to Class 3), car number may change depending on availability.

A7.12 Fuel Supply

A7.12.1 The fuels provided at Formula SAE Italy & Formula Electric Italy 2018 are expected to be 98 octane gasoline and E-85. No other fuel will be supplied.

A7.12.2 Fuel specifications will follow the standard specification for fuel for automotive spark-ignition engines.

A7.12.3 Fuel choice must be communicated per Fuel System Data form available on <http://formula-ata.it/docs> by **March 02, 2018**

A7.13 Electric Supply

A7.13.1 Electric vehicle teams must communicate per Electric System Data form available on <http://formula-ata.it/docs> by **March 02, 2018** main information about their electrical system and charger.

A7.14 Lists of team members

Preliminary List : once a team have been registered for the competition, it will have to upload within **March 10, 2018** the preliminary list of team members and the proof of membership, such as membership card or Society membership number.

Final List, health insurances, emergency contacts and drivers' data (link al form): within **May 10, 2018** every team will have to upload the final list of members, together with all members' personal documents (ID or passport, driver license and health insurance) in scanned .pdf file. Because of maximum file size limit of about 20 MB, three different separate files could be uploaded.

Payment for **Additional Team Members/guests** (more than 25 persons) can be made by bank transfer (See Appendix A-2 for further information).



A8 Vehicle Documentation, Deadlines and Penalties

A8.1 Required Documents and Required Forms

The following documents supporting each vehicle must be submitted by the action deadlines disclosed by the organizers.

A8.1.1 Following document templates are located at <http://fsaeonline.com>

- Structural Equivalency Spreadsheet (SES)
- Impact Attenuator Data (IAD)
- Structural Requirements Certification Form (SRCF)
- Electrical System Form (ESF)
- Business Logic Plan (BLC)
- Design Spec Sheet (DSS)
- Design Report (DR)
- ETC - Notice of Intent (ETC-NOI)
only for IC team with ETC

A8.1.2 Following document templates are located at event website (<http://formula-ata.it/docs>):

- Cost Report (CR)

A8.1.2 Following documentation can be filled in directly on event website (<http://formula-ata.it/docs>):

- Fuel System Data (FSD)
- Electric System Data (ESD)
- Electrical Systems Officer Form (ESO)
- Electrical Systems Advisor Form (ESA)

Demonstrative video is required for:

- Impact Attenuator Test (IATV)
- Vehicle Status (VSV)

A8.1.3 *PART IC - IC1.18 ETC - Failure Modes and Effects Analysis (FMEA)* is not required.

A8.1.4 *PART EV - EV9.2 Failure Modes and Effects Analysis* is not required for Class 1E vehicle.



A8.2 Deadlines

First Submission Due Date	No Update* Accepted Beyond	
January 16, 2018	-	Early Registration opens on January 15, at 10.00 AM CET (GMT +1). It closes on January 16, 2018 at 1.00 PM CET (GMT +1)
February 26, 2018	-	Registration opens on January 17 at 10.00 AM CET (GMT +1) It closes on February 26, 2018 at 1.00 PM CET (GMT +1)
February 02, 2018	-	CLASSES 1C/1E/3 – Business Logic Case
	March 02, 2018	CLASS DV – Business Logic Case
	-	CLASS 1C – Notice of Intent – Electronic Throttle Control (ETC)
	-	ALL CLASSES – Camping booking form
	June 26, 2018	CLASS 1E – Electrical Systems Officer and Electrical Systems Advisor Form
March 13, 2018	April 13, 2018	ALL CLASSES - Structural Equivalency Spreadsheet (SES) or Structural Requirements Certification Form (SRCF). Teams using a monocoque chassis must submit the SES Autocertification, in addition to the SES deadline
March 02, 2018	March 02, 2018	ALL CLASSES – Acceptance of camping requests
	March 07, 2018	ALL CLASSES – Preliminary team member list
	July 02, 2018	CLASS 1E – Electric System Data
	March 09, 2018	CLASS 1C – Fuel system data
March 28, 2018	July 02, 2018	CLASS 1E, CLASS 3 & DV– Electrical System Form
April 3, 2018	April 18, 2018	ALL CLASSES – Camping confirmation and payment
May 4, 2018	May 4, 2018	ALL CLASSES – e-Cost Report, e-BOM
May 11, 2018	May 15, 2018	ALL CLASSES – Final team member list
May 25, 2018	June 13, 2018	CLASS 1C/1E/DV – Impact Attenuator Data CLASS 1C/1E/DV - Impact Attenuator Test Video
May 30, 2018	June 14, 2018	ALL CLASSES – Design Report & Design Spec Sheet
June 1, 2018	June 8, 2018	ALL CLASSES – Invitation letters for VISA
June 7, 2018	June 7, 2018	ALL CLASSES – Team & camping withdrawal
June 19, 2018	June 26, 2018	CLASS 1C/1E - Vehicle Status Video
June 21, 2018	June 21, 2018	ALL CLASSES – Change of Faculty Advisor

* First column indicates due date for submitting the first version of documents. Second column indicates due date for submitting corrections and updates. Submissions between the due date and the date stated in the column "no update accepted beyond" may incur in penalties, following FSAEI 8.5 rule update. Please, check the rules.



A8.3 Submission Addresses and Formats

A8.3.1 All documents shall be uploaded and filled in event documentation website (<http://formula-ata.it/docs>).

A8.3.2 Allowed formats are: pdf, doc, docx, xls, xlsx, odt, ods. It is allowed to upload a zip-archive containing files in mentioned formats. Submitting files in other formats will be considered as "Not submitted". Maximum file size is indicated on website.

Notice: Teams is not notified if a document is submitted incorrectly. Therefore teams are advised to verify after upload that their documents can be downloaded and can be read for entire and that deadlines have been met.

A8.4 Late Submission Penalties

A8.4.5 Following penalties applies for program submission requirements:

- Same penalty as per *A8.4.1 Tech and Business Submission Penalty* is applied for late submission of the ETC - Notice of Intent (ETC-NOI).
- There is no point penalty for late submission of an electric system data (ESD).

A8.4.7 Teams that change category from Class 1 to Class 3 will receive applicable point penalties for documents whose deadline is earlier than change.

A8.5 Web Based Submission

Teams entering Formula SAE Italy & Formula Electric Italy 2018 must submit the documents online through <http://formula-ata.it/docs>.

The upload date and time on the website constitute the official record for deadline compliance.

Documents may be uploaded on the website from the time your account has been created until the "First Submission Due Date" deadline. Submissions may be replaced with new uploads at any point during that period without penalty.

Unless for changes specifically requested by the reviewers, documents uploaded after the "First Submission Due Date" and the "No Update Submissions Accepted Beyond" deadline are classified as late submissions and the appropriate penalties will be applied.

No submissions will be allowed after the "No Update Submissions Accepted Beyond" deadline, even if the document is required to access technical inspection (IAD, SES, ESF, FMEA and ESO/ESA). In this case, team may not be allowed to attend dynamic events.

A8.6 Account Signup for Online Submission - FSAEI Event Only

After confirmation of team registration, organization will send website user credential to each team leader.



A8.7 Impact Attenuator Test Video

A video of the Impact Attenuator crash must be uploaded on the Formula ATA website. The video must be recorded with a high-speed camera. The camera must be leant on a stable support and point at the test specimen on its upper side (when mounted on the car). Post-processing of the video must be done to slow down the crash and let the inspector analyze the impact.

Teams using Standard Impact Attenuator (FSAE rules Appendix T-3) don't need to crash the Impact Attenuator and consequently to upload any video.

A8.8 Vehicle Status Video

A8.8.1 All teams belonging to Class 1 must upload a video showing the vehicle driving prior to the competition. The purpose of the video is to define the scrutineering order for the technical inspection.

A8.8.2 The video must show the following sequences:

- Standing still (video close-up of the vehicle front left-side; min. 70%)
- Straight driving
- 180° cornering
- Straight driving back to start point
- Execution of an hard brake (possibly locking the wheels)
- Standing still (video close-up of the vehicle front right-side; min. 70%)

A8.8.3 The video must fulfill the following criteria:

- Continuous video from a third person view - no assembled sequences
- Vehicle must be clearly visible (light, video resolution, frames and frequency)
- Vehicle must run by its own power
- Driving in a clearly separated and/or protected area
- Vehicle must be presented in ready-to-race conditions incl. body work
- Driver must wear clothes as specified in the rules, incl. helmet, driver suit, gloves and arm-restraints
- [EV ONLY] Tractive System Active Light (TSAL) must be clearly visible in the video
- [EV ONLY] Ready-to-drive sound must be audible in the video
- Must not exceed a length of 45 seconds and size of 20 MB
- File format must be common like avi, mpg, mp4, wmv

A8.8.4 The submitted VSV will be reviewed based on the specified criteria above. Fulfilling the specified criteria is the responsibility of the team. The goal of the review is to recognize if the vehicle is in ready-to-race condition for the competition.

A8.8.5 The VSV will be reviewed in order of submission.

A8.8.6 If a team receives a "fail" for its video prior the VSV deadline, the video will be treated as not submitted. A new upload is possible afterwards.



A8.8.7 There will be no penalty for missing the upload deadline but if a team doesn't upload the video it will be ordered in the last position of the scrutineering list.

The last upload of a video is possible until 336 hours (14 days) after the VSV deadline.

A8.8.8 If a team receives a "fail" for its video after the VSV deadline, the team has 7 days, beginning from the point of notification, to improve the video and upload it again for a new review. If the team fails the review again, the team will be ordered in the last position of the scrutineering list.

A8.9 SES Submission

A8.9.1 Teams using a monocoque chassis must submit a SES Autocertification as one document, in addition to the SES deadline.

A8.9.2 The Structural Equivalency Spreadsheet (SES) must be checked and approved by:

- Validation/inspection organization (e.g. DEKRA, ...)
- Engineering firm for lightweight structures
- Engineering consultancy company
- Any other official competition

A8.9.3 If any changes to the original SES become necessary due to the approval process, the updated final SES must be uploaded again on the competition website.



APPENDIX A-2: PAYMENT DETAILS AND INVOICE

PAYMENT DETAILS

- Team registration: teams will have 48 hours, starting from registration time, to send us the proof of the bank transfer, certifying the payment date and time.
Registrations to the Formula SAE Italy & Formula Electric Italy 2018 will be confirmed only when the due amount is credited on the ANFIA Service Srl bank account.
- Camping confirmation: teams will have to send the camping confirmation form and the evidence of payment within **April 18, 2018** to the respective email address.
- Additional team member/guest: teams will have to send the ATM/Guest form with the evidence of payment within **May 15, 2018** to the respective email address.

When making the payments, please consider these new administrative regulations:

- - 22% Italian VAT is **ONLY** required from European and non European natural persons, who make the payment, i.e.: registration fee = **1.300,00€+ 22% VAT = 1.586,00€ total amount to be paid.**
- - 22% Italian VAT is **NOT** required from European companies owing a VAT code and from non European companies, who make the payment, i.e.: registration **fee = 1.300,00€ total amount to be paid.**
- 22% Italian VAT is **ALWAYS** required from all Italian participants (natural persons/companies), except for the Public Administrations, i.e.: registration fee = 1.300,00€+ 22% VAT = **1.586,00€ total amount to be paid.**

For Italian teams only

Following the recent rule related to the electronic invoicing to Public Administration, please refer to your administrative office in order to start the internal procedures of payment.

Payments method

- Bank transfer to: ANFIA Service Srl – **Bank name**: Cassa di Risparmio di Bra – Turin Branch - Corso Galileo Ferraris, 26 - Torino – Italy – **IBAN n.:** IT04G0609501001000000003046 – **Swift code**: BPMOIT22.

Please indicate on the bank transfer the following payment descriptions:

- Team name
- University name

Payment must be received in full. ALL bank transfer charges must be covered by the payer.

INVOICE

It is compulsory to fill in all the fields of the registration form.

Particularly, in the field of “VAT number” please check to have a correct **VAT NUMBER**. Please do not insert any other data: i.e. tax identification number.

If you do not have got one, please write “Not in possession” in the field.

The “Codice Fiscale” field is only for Italy.



APPENDIX A-3: CAMPING

A camping site will be available for the event **from July 11, at 8:30 AM to July 16, 2018 at 2:00 PM.** It will be located next to the circuit in Varano de' Melegari.

The camping check-in is foreseen on **July 11, 2018 from 8:30 AM to 5:00 PM.** It is **MANDATORY** for all teams to comply with the timetable.

Interested teams have to send ATA (s.migliaccio@anfia.it) the [Camping Booking Form](#) within **February 02, 2018.**

Camping requests will be accepted in the order they will be received. The camping availability will be communicated to teams within **March 02, 2018.**

The fee for 6 days is 55,00 € + 22% VAT = **67,10 €/person**

Within **April 18, 2018** teams must send the evidence of payment, together with the [list of members](#) and their passport/IC numbers.

We will accept only single payment for each team.

The **payment** can be made with bank transfer to:

ANFIA Service Srl

Bank name: Cassa di Risparmio di Bra – Turin Branch - Corso Galileo Ferraris, 26 - Torino – Italy –

IBAN n.: IT04G0609501001000000003046 – **Swift code:** BPMOIT22.

Please indicate on the bank transfer the following payment descriptions:

- Team name
- University name

Payment must be received in full. ALL bank transfer charges must be covered by the payer.

A refund of 50% of the overall amount of camping fee will be granted in case of team withdrawal, only if the communication is sent within **June 07, 2018.**



T General Technical Requirements

The following part of the rulebook includes some minor changes that must be followed by the teams which intent is to build the car according to "Formula Student Rules 2018 V1.1" (FSR) in order to take part to Formula SAE Italy & Formula Electric Italy 2018 event and other general rules.

Where not specified the additional rules must be followed by all the teams in order to take part to Formula SAE Italy & Formula Electric Italy 2018 event.

T3 Driver's Cell

T3.1 Vehicle Structure

All the frames built following FSG rules will be evaluated as follows:

- if the frame lies within the FSAE Official rules, the FSAE SES and FSG SES will be required;
- if the frame does not follow FSAE Official rules, FSG SES and a report according AF rules will be required.

The monocoques built following FSG rules will be accepted if certified as well as the other monocoques.

All the rules about "percussion" and template (SAE Rules T3.24, T4.1, T4.2) will follow the FSAE Official rules.

NOTE: the following FSG rule:

"T2.8.4 Both roll hoops must have one 4.5mm hole in a non-critical location and its surface at this point must be unobstructed for at least 180°"

will be accepted with no need to SES the roll hoop holes.

NOTE: the following FSAE rules:

"T3.11.7 In the front view of the vehicle, the vertical members of the Main Hoop must be at least 380 mm apart (inside dimension) at the location where the Main Hoop is attached to the bottom tubes of the Major Structure of the Frame."

will not be applied to cars following FSG rules.

NOTE: cars built following the FSG rule:



“T3.2.1 If the side impact structure is not made of tubes, the template must pass until it is 320mm above the lowest inside chassis point between the front and main hoop.”

Will be accepted.

T3.20 Impact attenuator

Impact attenuator must be dynamically tested and a video of the proof must be uploaded on the website as per A8.7.

Teams using Standard Impact Attenuator (FSAE rules Appendix T-3) don't need to crash the Impact attenuator.

T3.23 Front Bodywork

All edges of the bodywork that could come into contact with a pedestrian must have a minimum radius of 1 mm.

T3.27 Monocoque General Requirement

All monocoques must be certified by a third party without need of any additional physical testing or simulation. SES documentation must be provided in any case on the specified website.

The certification will be considered valid if coming from:

- a) University professor
- b) Validation/inspection organization (e.g. DEKRA, ...)
- c) Engineering firm for lightweight structures
- d) Engineering consultancy company
- e) Any other official competition

T5 Drivers Equipment (belts and cockpit padding)

T5.1.3 Harness Replacement

SFI spec harnesses must be replaced following December 31st of the 2nd year after the date of manufacture as indicated by the label. FIA spec harnesses must be replaced following December 31th of the year marked on the label.

Please note that SFI harnesses older than 2 years will not be accepted due to safety reason.



T5.2 Belt, Strap and Harness Installation - General

T5.2.2e Where a single shear tab is welded to the chassis, the tab to tube welding must be on both sides of the base of the tab. (NOTE: Cars built according to FSR must comply).

T5.3 Lap Belt Mounting

T5.3.4 To fit drivers of differing statures correctly, in side view, the lap belt must be capable of pivoting freely by using either a shouldered bolt or an eye bolt attachment. Mounting lap belts by wrapping them around frame tubes is not acceptable. (NOTE: Cars built according to FSR must comply).

T5.4 Shoulder Harness

T5.4.1 The shoulder harness must be mounted behind the driver to a single piece of uncut, continuous, closed section steel tubing that meets the requirements of T3.4.1. The shoulder harness bar may not be mounted to the Main Roll Hoop Bracing or attendant. (NOTE: Cars built according to FSR must comply).

T5.4.4 The shoulder harness mounting points must be between 178 mm and 230 mm apart.

T5.4.5 Any bolt used to attach belts, either directly to the chassis or to an intermediate bracket, must be a minimum of 10mm Metric Grade 8.8 (3/8 inch SAE Grade 5). (NOTE: Cars built according to FSR must comply) except for Anti – Submarine Belts, where a 8mm Metric Grade 8.8 will be accepted.

Referring to Harnesses please note the following table

LOAD BEFORE FAILURE	VALUE
Shoulder Harness	13kN
Lap Belts	13kN
ant-submarine Harness	6.5kN
lap+ant sub	19.5 kN
ACCEPTED BOLTS	GRADE
Shoulder Harness	M10 8.8
Lap Belts	M10 8.8
ant-submarine Harness	M8 8.8
BRACKETS TO CHASSIS	2 X M6 8.8



Bolts of diameters LESS THAN prescribed in the afore mentioned table will be allowed ONLY if physically tested, must be as a minimum Grade 12.9 and must comply with Safety Harness manufacturer mounting instructions.

T5.6 Head Restraint

Head restraint must comply with T5.6.2 except for the minimum area required. The minimum height must be 150 mm (with the minimum height adjustment of 175mm) OR the minimum height must be 280mm.

T6 General Chassis Rules

T6.1 Suspension

T6.1.1 The car must be equipped with a fully operational suspension system with shock absorbers, front and rear, with usable wheel travel of at least 50 mm, 25mm jounce and 25mm rebound, with driver seated.

T6.2 Ground Clearance

Ground clearance must be sufficient to prevent any portion of the car, other than the tires, from touching the ground during track events. Intentional or excessive ground contact of any portion of the car other than the tires will forfeit a run or an entire dynamic event. (NOTE: Cars built according to FSR must comply).

T6.3 Wheel

Minimum wheel size is 8.0 inches. (NOTE: Cars built according to FSR must comply).

T6.6 Jacking point

Jacking point is not required if the car can be lifted by no more than three people with the driver inside and leant on specific quick jack supports. When car is lifted from the jacking point, or leant on quick jacks, all traction wheels must be off the ground with 100mm clearance.

Engine cranking will be allowed only if traction wheels have the specified ground clearance and the quick jacks provide an adequate stability.

Jacking point can be red or orange.

T7 Brake System

T.7.4 Brake Light

Brake light shall be illuminated when brake energy regeneration is commanded.



T8 Powertrain

T8.2 System Sealing

Any vent on other systems containing liquid lubricant or coolant, i.e., a differential, gearbox, or electric motor must have a catch-can with a minimum volume of ten (10) percent of the fluid being contained or 0.5 liter (half U.S. quart), whichever is greater. (NOTE: Cars built according to FSR must comply).

NOTE: car following FGS rule:

“T6.3.3 Any vent on other systems containing liquid lubricant or coolant must have a catch-can with a minimum volume of 10% of the fluid being contained or 100 ml, whichever is greater.”

Will be accepted.

T8.4 Drive Train Shields and Guards

T8.4.3 Chain Drive - Scatter shields for chains must be made of at least 2.66 mm (0.105 inch) steel (no alternatives are allowed), and have a minimum width equal to three (3) times the width of the chain.

NOTE: car following FSG rule

“T6.4.5 For metallic chains and belts: 2mm steel.”

Will be accepted

T9 Aerodynamic Devices

Both SAE and FSR configuration will be admitted BUT no cars build according to FSAE rules will be allowed to run with FSR aero devices and vice versa, no cars build following FSR will be allowed to run with FSAE aero devices.

T11 Fasteners

T11.1 Fastener Grade Requirements

T11.1.1 All threaded fasteners utilized in the driver's cell structure, and the steering, braking, driver's harness and suspension systems must meet or exceed SAE Grade 5, Metric Grade 8.8 and/or AN/MS specifications.

T11.1.2 The use of button head cap, countersunk head, pan head, flat head or round head screws or bolts is prohibited in ANY location in the following systems. Hexagonal recessed drive screws or bolts (sometimes called Socket head cap screws or Allen screws/bolts) are permitted:



- a. Primary Structure attachments
- b. Impact attenuator attachment
- c. Driver's harness attachment
- d. Steering system
- e. Brake system
- f. Suspension system
- g. Driver's cell structure

(NOTE: Cars built according to FSR must comply).

T11.1.3 Any bolted joint in the primary structure using either tabs or brackets, must have an edge distance ratio "e/D" of 1.5 or greater. "D" equals the hole diameter. "e" equals the distance from the edge of the hole to the nearest free edge

NOTE: the following FSG rule:

T9.1.5 Any bolted joint in the primary structure using either tabs or brackets, must have an edge distance ratio "e/D" of 1.5 or greater. "D" equals the hole diameter and "e" equals the distance from the hole centerline to the nearest free edge of the tab or bracket. Any tabs attaching suspension members to the primary structure are not required to meet this rule.

Will be accepted noting that:

FOR TABS/BRACKETS ATTACHING DRIVER'S HARNESES a minimum cross sectional area of tab or bracket must be 60mm² ,Where lap belts and anti-submarine belts use the same attachment point, a minimum cross sectional area of 90mm².

T11.2 Securing Fasteners

T11.2.1 All critical bolt, nuts, and other fasteners on the steering, braking, driver's harness, and suspension must be secured from unintentional loosening by the use of positive locking mechanisms. Positive locking mechanisms are defined as those that:

- a. The Technical Inspectors (and the team members) are able to see that the device/system is in place, i.e. it is visible.
- b. The "positive locking mechanism" does not rely on the clamping force to apply the "locking" or anti-vibration feature. In other words, if it loosens a bit, it still prevents the nut or bolt coming completely loose.

Positive locking mechanisms include:

- a. Correctly installed safety wiring
- b. Cotter pins
- c. Nylon lock nuts (Except in high temperature locations where nylon could fail approximately 80 degrees Celsius or above)
- d. Prevailing torque lock nuts

Lock washers, bolts with nylon patches and thread locking compounds, e.g. Loctite®, DO NOT meet the positive locking requirement.

T11.2.2 There must be a minimum of two (2) full threads projecting from any lock nut.



T14 Equipment Requirements

T14.6 Underclothing

All competitors must wear fire resistant underwear (long pants and long sleeve t-shirt) under their approved driving suit.

T14.14 Fire Extinguishers

Each team must have at least two (2) 0.9 kg (2 lb.) dry chemical/dry powder fire extinguishers.

The extinguisher **MUST BE LABELED WITH TEAM'S AND SCHOOL NAME.**



IC Internal Combustion Engine Vehicles

IC1 Internal Combustion Engine Powertrains

IC1.1.1 The engine(s) used to power the car must be a piston engine(s) using a four-stroke primary heat cycle with a displacement not exceeding 710 cc per cycle. Hybrid powertrains, such as those using electric motors running off stored energy, are prohibited.

IC1.5 Throttle and Throttle Actuation

IC1.5.5 Throttle cables must be at least 50 mm from any exhaust system component and out of the exhaust stream.

IC1.8 Fuel Lines

IC1.8.2 If rubber fuel line or hose is used, the components over which the hose is clamped must have annular bulb or barbed fittings to retain the hose. Also, clamps specifically designed for fuel lines must be used. These clamps have three (3) important features, (i) a full 360-degree (360°) wrap, (ii) a nut and bolt system for tightening, and (iii) rolled edges to prevent the clamp cutting into the hose. Worm-gear type hose clamps are not approved for use on any fuel line. (NOTE: Cars built according to FSR must comply).

IC1.18 Failure Modes and Effects Analysis (FMEA)

FMEA for ETC system is not required.

IC2 Fuel and Fuel System

IC2.5.3 A firewall must be incorporated to separate the fuel tank from the driver, per Rule T4.5.

PLEASE NOTE: rule IC2.5.3 MANDATORY FOR ALL CARS.

NOTE: a firewall must be placed to protect any spillage from the fuel filler neck to any portion of the exhaust system.

IC2.6 Fuel Tank Filler Neck & Sight Tube

IC2.6.3 The sight tube must have at least 125 mm (4.9 inches) of visible vertical height and a minimum inside diameter of 6 mm (0.25 inches). (NOTE: Cars built according to FSR must comply).

IC2.6.8 Not necessary to ensure access to a 2 gallons tank.



IC2.7 Tank Filling Requirement

IC2.7.1 The fuel tank must be capable of being filled to capacity without manipulating the tank or the vehicle in any manner. The Fuel System must be designed in a way that during refueling of the car on a level surface, the formation of air cavities or other effects that cause the fuel level observed at the sight tube to drop after movement or operation of the car (other than due to consumption) is prevented. During fueling or refueling the vehicle may only be touched by the fuel crew and officials. The tank will be filled to the fill line, or if a filling system is used, to the automatic stop point. If, for any reason, the fuel level changes after the team have moved the vehicle, then no additional fuel will be added. (NOTE: Cars built according to FSR must comply).

NOTE: All parts of the fuel storage and supply system IS MANDATORY to be adequately protected against any heat sources and located at least 70mm from any exhaust system component.

IC4 Electrical System and Shutdown System

IC4.4 Batteries

IC4.4.1 Battery packs based on Lithium Chemistry:

- a. Must have overcurrent protection that trips at or below the maximum specified discharge current of the cells.
- b. Must have a rigid, sturdy and fire retardant casing.
- c. Must be separated from the driver by a firewall as specified in T4.5

In addition, battery packs based on lithium chemistry other than lithium iron phosphate (LiFePO₄):

- d. Must have overtemperature protection of at least 30% of the cells that trips at or below the maximum specified temperature of the cells and disconnects the battery.
- e. Must have overvoltage protection of all cells that trips at or below the maximum specified voltage of the cells and disconnects the battery.

IC4.4.6 Low voltage batteries must be contained within the envelope of any part of the frame which is made from any regulated tubing and/or an additional envelope of tubing such that they are protected against being damaged in case of a crash or roll-over situation.



EV Technical Regulations - Electric Vehicles

EV1 Electric System Definitions

EV1.2 Grounded Low Voltage and Tractive System

EV1.2.8 All components in the tractive system must be rated for the maximum tractive system voltage.

However, Accumulator Management System (AMS) cell voltage measurement inputs and supply voltage of decentralized AMS slaves may be rated below the maximum tractive system voltage if the team has proven by calculations in the Electrical System Form (ESF) that the input voltage rating is reasonably chosen.

EV3 Tractive System - Energy Storage

EV3.3 Tractive System Accumulator Container - Electrical Configuration

EV3.3.9 Each accumulator container must have a prominent indicator, such as an LED that will illuminate whenever a voltage greater than 60V DC is present at the vehicle side of the AIRs.

However, prominent indicator required for each accumulator container may illuminate whenever a voltage half the nominal tractive system voltage is present at the vehicle side of the AIRs.

EV3.4 Tractive System Accumulator Container - Mechanical Configuration

EV3.4.16 In addition to FSAE rule EV3.4.6, accumulator containers may be made of composite material. In this case containers must satisfy the following requirements:

- Data obtained from the laminate perimeter shear strength test and three point bending test (T 2.6) should be used to prove adequate strength is provided.
- Each attachment point requires steel backing plates with a minimum thickness of 2 mm. Alternate materials may be used for backing plates if equivalency is approved.
- The calculations and physical test result must be included in the SES.

EV3.6 Accumulator Management System (AMS)

EV.3.6.8 The AMS shall have an output device, such as display or laptop connection, where it is possible to see every monitored parameter during technical inspection and during charging phase.



EV4 Tractive System – General Requirements

EV4.5 Tractive System Insulation, wiring and conduit

EV4.5.12 As exception, components, e.g. inverters, certified for automotive use might be allowed without positive locking feature, if connections are done as given by the manufacturers datasheet and no positive locking is possible.

EV4.12 Tractive System Active Light (TSAL)

EV4.12.1 The vehicles must include a single Tractive Systems Active Light (TSAL) that must illuminate when the tractive system is active. The TSAL must not perform any other functions but it may illuminate when pre-charge relay is closed. For vehicles with maximum Tractive System voltage lower than above thresholds, team shall request competition organization approval to use alternate definition for Tractive System Active, for which TSAL must illuminate.

EV4.12.3 The TSAL itself must:

- a. Be directly controlled by the voltage present within the tractive system using hard wired electronics. Software control is not permitted.
- b. Be red in color when it illuminates because tractive system is active.
- c. Flash continuously with a frequency between 2Hz and 5Hz when illuminated.

TSAL may be in green color and continuously illuminated if the tractive system is deactivated and the GLV system is switched on.

EV5 Shutdown Circuit and Systems

EV5.5 Insulation Monitoring Device (IMD)

EV5.5.4 IMD indicator shall not illuminate in case no isolation fault is detected. However it is allowed having IMD illuminated for maximum 2 seconds since activation of GLV system — in order to check indicator functionality.

EV5.5.5 In case of single IMD indicator, it shall not be located on steering wheel or on any other removable component of cockpit.

EV5.5.6 IMD indicator should be comanded from IMD device without any serial communication.



D DYNAMIC EVENT REGULATIONS

D11 General Rules

All people using the dynamic pass must wear closed shoes and long pants except for the static technical inspection.