

# FORMULA STUDENT EAST RULES 2023

#FORMULASTUDENTEAST

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## 1. INTRODUCTION

Formula Student East (hereafter FS East) is a FSAE style Formula Student engineering competition in Hungary, organized by the Association of Automotive Engineers (AAME) since 2016.

Formula Student East 2023 will allow vehicles with conventional internal combustion engines (gasoline or ethanol fuelled) and electric powertrain. Furthermore Formula Student East welcomes the participation of driverless vehicles (both with internal combustion or electric powertrain). The three categories will be evaluated separately:

- Internal Combustion Vehicles (hereafter CV)
- Electric Vehicles (hereafter EV)
- Driverless Vehicles (hereafter DV)

These specific rules are additions to the Formula Student Rules 2023 document (hereafter “FSG Rules 2023”) published by Formula Student Germany (<https://www.formulastudent.de/>) and FS CV Hybrid Rules Extension 2023 published by Formula Student East (<https://fseast.eu/>) and other competitions. In case of a conflict between the above mentioned documents and the FS East Rules 2023, the FS East Rules 2023 supersede them.

## Abbreviations used in this document

Abbreviations used	Name
FS East Rules 2023	FS East Rules
FSG Rules 2023	FS Rules
CV Hybrid Rules 2023	FS CV Hybrid Rules Extension
ADR	Autonomous Design Report
AS	Autonomous System
ASF	Autonomous System Form
ASR	Autonomous System Responsible
BOM	Bill of Material
CBOM	Costed Bill of Material
CV	Internal Combustion Vehicle
DNF	Did not finish
DOO	Down or out
DQ	Disqualified
DSS	Design Specification Sheet
DV	Driverless Vehicle
EDE	Engineering Design Event
EDR	Engineering Design Report
EV	Electrical Vehicle
HSD	Hybrid System Description
IAD	Impact Attenuator Design
SES	Structural Equivalency Spreadsheet
TMD	Team Member Designation
VSV	Vehicle Status Video

## Sites used in FS East

FS East website	fseast.eu
FS East Quiz website	quiz.fseast.eu
FS East team and participant management, documentum upload	login.fseast.eu



## 2. GENERAL

### 2.1. COMPETITION DATES AND PLACE

FS East 2023 will be held in summer 2023, exact date and location will be published later.

### 2.2. FS EAST RULES 2023

The Formula Student East 2023 competition is compliant with the 'Formula Student Rules 2023' document (hereafter 'FSG Rules 2023') published by Formula Student Germany (<https://www.formulastudent.de/fsg/rules/>) and 'FS CV Hybrid Rules Extension 2023' document (hereafter 'CV Hybrid Rules 2023') published by Formula Student East (<https://fseast.eu/>) and other competitions.

The here presented *FS East Rules 2023* and all additional rule updates are additions to the above mentioned documents. In case of a conflict between those documents and the *FS East Rules 2023*, the *FS East Rules 2023* supersede the other two documents.

Additionally, all guidelines and clarifications posted in the 'Rules and Important Documents' section on the FS East website (<https://fseast.eu/>) for the current season are considered as official documents and therefore are applicable to the teams competing at FS East 2023.

### 2.3. CATEGORIES AND SCORING

Formula Student East 2023 will allow vehicles with conventional internal combustion engines (gasoline or ethanol fuelled) and electric powertrain. Furthermore Formula Student East welcomes the participation of driverless vehicles (both with internal combustion or electric powertrain).

The competing teams and vehicles will be evaluated in the following three categories separately:

- Internal Combustion Vehicles (hereafter CV)
  - Internal Combustion Vehicles can join this category with or without Hybrid capabilities
- Electric Vehicles (hereafter EV)
- Driverless Vehicles (hereafter DV)

The vehicles with a hybrid powertrain system built according to *CV Hybrid Rules 2023* are competing in the CV category.

	CV & EV	DV
<b>Static Events:</b>		
Business Plan Presentation	75 points	75 points
Cost and Manufacturing	100 points	100 points
Engineering Design	150 points	300 points
<b>Dynamic Events:</b>		
Skid Pad	75 points	75 points
Acceleration	75 points	75 points
Autocross	100 points	100 points
Endurance	325 points	-
Efficiency	100 points	75 points
Trackdrive	-	200 points
Overall	1000 points	1000 points

## 2.4. RULE CATEGORY CLARIFICATION

[EV Only] rules are applied to vehicles with electrical drivetrain, [CV Only] rules are applied to vehicles with internal combustion engines, regardless of whether or not these cars have driverless capabilities.

[DV Only] rules are applied to the driverless vehicles with autonomous system defined according to T14 in *FSG Rules 2023* regardless of the drivetrain and they are registered for the DV category in FS East 2023, however they are still obligated by the drivetrain specific rules. Vehicles with an autonomous system that are only participating in EV or CV category do not need to be compliant with [DV Only] rules.

## 2.5. RULES QUESTIONS

Any rule clarification questions or rule ambiguities concerning the rules for FS East will be resolved by the FS East Rules Committee. The Rules Committee will answer both FS East Rules 2023 and FSG

Rules 2023 questions, but the decisions and clarifications given are only valid for the FS East competition and only for the present competition year.

Rules questions should be submitted to [rules@fseast.eu](mailto:rules@fseast.eu). Do not ask about more than one rule per mail.

## 2.6. OFFICIAL LANGUAGE

The FS East 2023 official language is English.

## 2.7. OFFICIAL TIME

The FS East 2023 official time:

From	Till	Time
30 October 2022	26 March 2023	Central European Time (CET)
27 March 2023	29 October 2023	Central European Summer Time (CEST)

For all deadlines and decisions only the FS East server time is authoritative.

1 day equals 24 hours. `One day later` is 24 hours counted from the defined deadline time or from the reply time of an official.

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

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

## 2.8. FS EAST REGISTRATION



*Good luck for the FS East 2023 registration!*

Since 2016 the FS East Event intends to organize a simple, and clear registration procedure, keeping in mind that overseas teams may have disadvantages caused by internet latencies. Different regions of the world will have a dedicated number of slots during the first period of the registration procedure.

### 2.8.1. IMPORTANT DATES

Main dates:	From:	To:
Team Registration	13th of January 08:00 CET	20th of January 23:59 CET
Event Registration Quiz	27th of January 11:00 CET	27th of January 16:59 CET
Quiz Protest Period	27th of January 17:00 CET	27th of January 23:59 CET
Periods	From:	To:
Event Registration Period 1	27th of January 11:00 CET	29th of January 23:59 CET
Event Registration Period 2	30th of January 00:00 CET	31st of January 23:59 CET
Event Registration Period 3	1st of February 00:00 CET	30th of May 19:59 CET

### 2.8.2. TEAM REGISTRATION - GETTING YOUR UNIQUE IDS FOR THE QUIZ

The Team Registration Form will be available at: <http://login.fseast.eu>

#### Registration process:

1. The team captain should be registered.
2. The team captain must register the team as well.
3. After the Team Registration a confirmation email will be sent with the data.
4. The rest of the team members must register after the Quiz (details will be announced later), and they must join the already created team once they register.

#### 2.8.2.1. REGISTRATION WITH MULTIPLE TEAMS FROM THE SAME UNIVERSITY

**Participation with multiple vehicles:** In the case that a university takes part in FS East 2023 in two or three categories (CV, EV, DV), each participation counts as a separate team and all the teams must be registered.

Multiple team registration (i.e.: registration with the same vehicle, with the same team to the same category) is prohibited. Each team should be registered by the team captain only once.

Team Registration closes on the 20th of January 23:59 CET. Only teams who created a valid team account until the deadline are able to participate in the quiz.

We are going to validate the registered teams after the quiz. Those participating in the quiz under multiple accounts will be penalized or disqualified.

#### 2.8.2.2. MULTIPLE REGISTRATIONS WITH THE SAME CAR

Teams are allowed to participate in multiple categories with the same car (eg. DV and EV, or CV and DV), with the following restrictions:

- Teams are virtually treated as two separate Teams in the scoring and results.
- Teams have to register as one team and mark that they intend to attend as an EV-DV or a CV-DV
- Teams need to pass the quiz in both categories
- Both registration fee have to be paid
- They have to pass the DV technical inspection process to participate in the dynamic events



- If the DV technical inspection fails, but the EV or CV is passed, and scrutineers state that the autonomous system can be safely disabled, the car can participate in non-autonomous driverless events.
- Configuration change in the car after technical inspection is prohibited.
- For the Static and Dynamic Events the schedule is not guaranteed to be convenient.
- All Dynamic events will be available and scored separately for the DV and the CV/EV category as well.
- For the Static Events the following apply:
  - Business Plan Presentation Event
    - The team needs to have only one business presentation, presenting once for both categories.
  - Cost & Manufacturing Event
    - The team needs to attend one time for the Cost and Manufacturing Event with questions both for CV/EV and DV category.
  - Engineering Design Event
    - The team needs to attend one time for the Engineering Design Event with questions both for CV/EV and DV category.

### 2.8.3. EVENT REGISTRATION QUIZ FORMS (CV, EV AND DV)

The Event Registration Order will be determined by the results of the Event Registration Quiz.

Separate Event Registration Quiz Forms will be available for Internal Combustion (CV), Electric Vehicle (EV) and Driverless (DV) Teams.

The links of the Event Registration Quiz Forms will be available at: <http://quiz.fseast.eu> & <http://fseast.eu/registration>

The following team data will be required:

- Login name & password
- answers of single choice and/or multiple choice questions

#### IMPORTANT:

After you finish, you must click the “Submit” button at the end of the Event Registration Quiz Form.

The system will log the timestamp, which will be used to create the registration order.

Every wrong answer will add 120 seconds to the registration timestamp.

**Each team will have only one opportunity.**

**NOTE:** After the Event Registration you will get a confirmation message: "Your response has been recorded."

#### **2.8.4. REGIONS**

FS East defines four regions:

##### **Definition of region A:**

Countries of the following list: Andorra, Austria, Belgium, Denmark, Finland, France, Germany, Iceland, Ireland, Italy, Liechtenstein, Luxembourg, Malta, Monaco, Netherlands, Norway, Portugal, San Marino, Spain, Sweden, Switzerland, United Kingdom, Vatican City State.

##### **Definition of region B:**

Countries in standard time zones from -1 to -12 (international date line).

##### **Definition of region C:**

Albania, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, North Macedonia, Georgia, Greece, Hungary, Kazakhstan, Kosovo, Latvia, Lithuania, Moldova, Montenegro, Poland, Romania, Russia, Serbia, Slovakia, Slovenia, Turkey, Ukraine.

##### **Definition of region D:**

Countries in standard time zones from 0 to +12 (international date line), except countries of region A and C.

## 2.8.5. EVENT REGISTRATION SLOTS AND LISTS

FS East 2023 competition opens slots for 24 combustion 36 electric and 24 driverless teams. The organisers will handle the documents of maximum 6 combustion 8 electric and 6 driverless waiting list teams.

FS East 2023 defines the following lists:

List A - cv	3 slots
List A - ev	6 slots
List A - dv	5 slots
List B - cv	2 slots
List B - ev	3 slots
List B - dv	2 slot
List C - cv	5 slots
List C - ev	6 slots
List C - dv	4 slots
List D - cv	2 slots
List D - ev	3 slots
List D - dv	1 slot
List ABCD - cv (A-B-C-D additional joint list)	12 slots
List ABCD - ev (A-B-C-D additional joint list)	18 slots
List ABCD - dv (A-B-C-D additional joint list)	12 slots
Waiting list - cv	---
Waiting list - ev	---
Waiting list - dv	---



### 2.8.6. INVITED TEAMS

Based on the results of 2022, the following teams are invited to Formula Student East 2023 as pre-registered teams: the top three teams per category of Formula Student East 2022, the highest ranked Hungarian team per category of Formula Student East 2022 and the top three teams in Formula Student Online 2022.

List ABCD - cv:

1. High Speed Karlsruhe - FS East 2022
2. Rennteam Uni Stuttgart e.V. - FS East 2022
3. Arrabona Racing Team - FS East 2022

List ABCD - ev:

1. GreenTeam Uni Stuttgart Electric - FS East 2022
2. FS Team Tallinn - FS East 2022
3. TU Brno Racing - FS East 2022
4. BME Formula Racing Team - FS East 2022
5. Formula Electric Belgium - FS Online 2022
6. TU Graz Racing Team - FS Online 2022
7. ARUS Andalucia Racing Team - FS Online 2022

List ABCD - dv:

1. KA-RaceIng Driverless - FS East 2022
2. Dynamis PRC - FS East 2022
3. FS Team Tallinn Driverless - FS East 2022
4. BME Formula Racing Team - FS East 2022

The pre-registration opportunity is open until 20th of January (Friday), 23:59 CET for the listed teams above. To confirm the pre-registered status, the team must send an email with subject "TEAM NAME - Pre-registration confirmation" to [hello@fseast.eu](mailto:hello@fseast.eu) until the given deadline. The registration will be accepted only if they pay the registration fee until 26th of January (Thursday), 23:59 CET. For registration fees and banking information see 2.8.8.1



## 2.8.7. EVENT REGISTRATION PERIODS

### 2.8.7.1. EVENT REGISTRATION PERIOD 1

During the 1st Period teams will compete to get on their own (dedicated) lists. For example an electric team from the **Region C** will be able to get on the **List C - ev**.

If one region's list gets full, the additional joint lists (**List ABCD - cv**, **List ABCD - ev**, **List ABCD - dv**) will be filled.

If one of the **List ABCD - cv**, **List ABCD - ev** or **List ABCD - dv** gets full, further teams will get on the waiting lists (Waiting list - cv, Waiting list - ev, Waiting list - dv ).

### 2.8.7.2. EVENT REGISTRATION PERIOD 2

From the start of the 2nd period, empty slots of a region will be filled with teams from the waiting list.

### 2.8.7.3. EVENT REGISTRATION PERIOD 3

From the start of the 3rd period, the remaining free places of a vehicle category (CV, EV, DV) may be filled on the discretion of the organizers, with Waiting List applicants of the other category. (For example: if there are any free CV places, they may be filled with EV or DV teams, and vice versa.)

Besides this, in the 3rd period the **first 6 CV teams of the Waiting list - cv**, the **first 8 EV teams of the Waiting list - ev**, and the **first 6 DV teams of the Waiting list - dv** will be asked to pay a part of the registration fee (see 2.8.8.3.)

During the season the organizer will handle the documents of the starter and the waiting list teams together. Corrections, e-mailing and documents upload deadline system will be active for all of the teams that are accepted or are in the top teams of the waiting list.

## 2.8.8. REGISTRATION FEE

### 2.8.8.1. PAYMENT INFORMATION FOR TEAMS ON THE STARTER LIST

Teams will have to pay the registration fee, which does not include the lodging fee if a team applies for camping. There is no limit to team size.



Teams which would like to apply for multiple categories (EV-DV, CV-DV) must pay both of those categories' complete registration fee.

Registration fee:

CV: 2100 EUR + VAT (+27%)

EV: 2250 EUR + VAT (+27%)

DV: 2500 EUR + VAT (+27%)

VAT-free payment is only acceptable from the following teams (otherwise transfer the 27% VAT as well)

- Teams with a valid EU VAT number (make sure you have filled it correctly in your team profile)
- Those teams which are located outside the European Union thus do not have an EU VAT number but do have VAT number and its validity can be proven by sending us a certification electronically, then we can issue the invoice with a net amount of registration fee. Contact your finance department about a certification and send it to us via email with your request for a proforma invoice (if you need a proforma). If your country has a public website which contains authenticated data of organizations/companies and it includes VAT numbers as well, a website link can be sufficient as a certification.

In case your team does not have a VAT number or is located in Hungary, please transfer the full amount of registration fee including 27% VAT.

You are able to request a proforma invoice before payment at [hello@fseast.eu](mailto:hello@fseast.eu).

Electronic invoices are issued upon successfully completed payments.

**After the quiz results are fixed, every team on the starter list has 2 workdays to pay the registration fee via bank transfer.** A payment receipt document provided by the account holder's bank should be submitted to [hello@fseast.eu](mailto:hello@fseast.eu) as a confirmation. Please mind the deadline, that you can be moved to the end of the waiting list due to late payment.

**Banking information**

Account Holder: Association of Automotive Engineers

Account Holder Address: H-9081, 102nd Mélykút Street, Győrújbarát, HUNGARY

Account Number: 10400511-50526983-78711011

IBAN: HU15 1040 0511 5052 6983 7871 1011

BIC (SWIFT) Code: OKHBHUHB

Bank name: K&H Bank Zrt.

Bank address: H-1095, 9th Lechner Ödön fasor, Budapest, HUNGARY

Reference: FS East registration fee, [Team Name]

**2.8.8.2. REFUND POLICY****2.8.8.2.1. REFUNDS IF FS EAST NEEDS TO BE CANCELED**

Canceling reasons:

- If there will be any governmental restrictions applied for events above 1500 people (FS East reserves the right to limit the number of participants per team, details will be published in the Event Handbook or in later versions of FS East rules.)
- If at least 70% of the starter list teams overall are not able to travel to the event due to border crossing restrictions
- If at least 70% of the starter list teams overall have withdrawn for any reason

Canceling until 31th March 2023 - 90% Refund

Canceling until 31th May 2023 - 60% Refund

Canceling until 30th June 2023 - 0% Refund

**2.8.8.2.2. REFUNDS IF A TEAM CANNOT PARTICIPATE DUE TO ANY REASONS**

If a team cancels the participation in the event, FS East will not refund the registration fees.

Teams on the waiting list who cannot participate at the event due to any reason can get the registration fee back, if they have already paid only the first part of the registration fee (see 2.8.8.3) and do not want to use any of the services provided by the organizers of Formula Student East (for example document review and correction etc.).

### 2.8.8.3. PAYMENT INFORMATION FOR TEAMS ON THE WAITING LIST

The first part of the registration fee for the (top 6 combustion, top 8 electric, and top 6 driverless) teams on the waiting list will be

CV: 600 EUR + VAT (27%)

EV: 700 EUR + VAT (27%)

DV: 900 EUR + VAT (27%),

which also has to be paid within 2 workdays, or you will be moved to the end of the waiting list.

When they get on the starting list, they will have to pay the rest of the registration fee.

CV: further 1500 EUR + VAT (27%)

EV: further 1550 EUR + VAT (27%)

DV: further 1600 EUR + VAT (27%)

VAT-free payment is only acceptable from the following teams (otherwise transfer the 27% VAT as well)

- Teams with a valid EU VAT number (make sure you have filled it correctly in your team profile)
- Those teams which are located outside the European Union thus do not have an EU VAT number but do have VAT number and its validity can be proven by sending us a certification electronically, then we can issue the invoice with a net amount of registration fee. Contact your finance department about a certification and send it to us via email with your request for a proforma invoice (if you need a proforma). If your country has a public website which contains authenticated data of organizations/companies and it includes VAT numbers as well, a website link can be sufficient as a certification.

In case your team does not have a VAT number or is located in Hungary, please transfer the full amount of registration fee including 27% VAT.

You are able to request an electronic proforma before payment at [hello@fseast.eu](mailto:hello@fseast.eu).

Electronic invoices are issued upon successfully completed payments.

Banking information is at 2.8.8.1.

### **2.8.9. FS EAST REGISTRATION REQUIRED CONTACT INFORMATION**

During the team registration process the team has to add all the necessary informations: team data, university data, billing information, and car data

All participants have to register on [login.fseast.eu](http://login.fseast.eu), and have to submit all necessary data about themselves (Health Insurance Certificate, etc.). The Team Captain's responsibility is to make sure all team members have registered and the uploaded data and documents are correct.

### **2.8.10. TEAM MEMBERS**

All team members (including the team captain) must adhere to the A4.2 section of the FSG Rules 2023. Professional drivers with an FIA license are not allowed to be registered as drivers.

### **2.8.11. FACULTY ADVISOR**

FS East 2023 allows all participating teams to have a Faculty Advisor present with them at the competition. Any Faculty Advisor being registered as such must be a valid member of the faculty he/she is representing and can not be a student.

## **2.9. EVENT HANDBOOK**

The FS East Event Handbook may contain special event procedures and restrictions for example regarding working on the car etc. It has to be read and understood by all event participants.

## **2.10. UNSPORTSMANLIKE CONDUCT**

Unsportsmanlike conduct, intentional deception of a judge or a scrutineer, or dangerous irresponsible behaviour may be penalized with point deduction and can be reason for instantaneous disqualification.

## **2.11. TESTING AND WORK SAFETY**

FS East is not responsible for the use of the cars other than at the event.

Furthermore, the organizers of the FS East dissociate themselves from all activities of the teams besides FS East and associated events.

Nevertheless, all teams are advised to follow common practices and common sense when working on the vehicle and when operating the vehicle, also before and after the FS East event.



Cars designed and manufactured for the participation of Formula Student events should not participate in events not suitable for Formula Student vehicles like hill climbs, drag races or similar events. Teams should never use their cars for wheel-to-wheel races.

The following listed requirements should at least be met to qualify as a safe testing/driving environment, but does not mean that following these guidelines guarantees safety under all circumstances.

- Driver wearing full protection gear incl. arm restraints
- Working TSAL, IMD, BMS/AMS, Torque Encoder plausibility check, torque/brake encoder plausibility check, brake system plausibility device, ETC plausibility check, ASSI and EBS if applicable.
- Rules compliant frame/monocoque
- Mounted impact attenuator
- No wheel to wheel racing
- No other passenger cars, trucks etc. being driven on the same premise at the same time, unless the area is clearly separated
- No driving under low visibility conditions
- No driving at speeds above typical event speeds, see Part D of the FS Rules for details
- No driving in areas where crashing into obstacles at the height of the driver's head is possible, such that parts of the vehicle may pass below an obstacle, but the driver's head can be trapped between the obstacle and the main roll hoop for example.

FS East reserves the right to disqualify a registered team in case of unsafe driving behavior, especially if the reputation of Formula Student organizers, sponsors and other teams is compromised. The decision to remove a team from the FS East competition has to be made unanimously by the FS East rules committee and will be made public on the FS East website.

**NOTE:** This rule has not been established to annoy you, but to ensure that we experience a safe and accident-free Formula Student season.

## 2.12. [CV ONLY] FUEL TYPE ORDER

The teams must inform FS East of the type of fuel they intend to use. The fuel type can be chosen after registration at FS East website. The fuel types provided are expected to be 100 octane (RON 100) gasoline and MOL Racing Fuel DRX (ethanol 85%, with 15% RON 106 maingrade gasoline).

## 2.13. [EV ONLY] ELECTRICAL SYSTEM OFFICER(S) DECLARATION

All EV teams and DV teams with electric traction systems must declare Electrical System Officer(s). Please note the responsibilities of the ESO in A4.3 of the Rules 2023. The ESOs have to be nominated by the team captain on login.fseast.eu (details will be announced later). The number of ESOs are limited to 5 per team.

No diploma or degree will be required, but a liability statement needs to be received and signed on the event.

## 2.14. [DV ONLY] AUTONOMOUS SYSTEM RESPONSIBLE(S) DECLARATION

All DV teams must submit an Autonomous System Responsible(s) Form. Please note the responsibilities of the ASR in A4.4 of the Rules 2023. The number of ASRs are limited to 5 per team.

The ASRs have to be nominated by the team captain on login.fseast.eu (details will be announced later). No diploma or degree will be required, but a liability statement needs to be received and signed on the event.

## 2.15. TECHNICAL DOCUMENTS

The technical documents count as SES & SE3D, IAD, ESF, ASF and HSD.

SES & SE3D, IAD, ESF, ASF must be uploaded through the FSG website. Teams who will be participating in multiple competitions (FS East, FSG, FSA, FSN, FSCH) need to upload each document only to this website to be eligible for participating in every competition. **Teams who will be only participating at FS East also need to register their team on the FSG website and take part in the FSG registration quiz to be able to upload these documents.**

Teams who are either on the waiting list or on the withdrawn list or on the participating list for FSG 2023 can upload this document. If your team can not be found on one of these lists please do not hesitate to contact us

Teams with a hybrid drivetrain must submit their HSD through the login.fseast.eu.

## 2.16. ENGINEERING DESIGN DOCUMENTS

### 2.16.1. ENGINEERING DESIGN REPORT

All teams must submit the Engineering Design Report on the FS East website no later than the specified deadline (the deadline will be published in the FS East Rules 2023 version 1.1, beginning of



February, 2023). Once the organizers accept the document, the submission is considered to be complete.

### **2.16.2. DESIGN SPEC SHEET**

All teams must submit the Design Spec Sheet on the FS East website no later than the specified deadline (the deadline will be published in the FS East Rules 2023 version 1.1, beginning of February, 2023). Once the organizers accept the document, the submission is considered to be complete.

### **2.16.3. [DV ONLY] AUTONOMOUS DESIGN REPORT**

All DV teams must submit the Autonomous Design Report on the FS East website no later than the specified deadline (the deadline will be published in the FS East Rules 2023 version 1.1, beginning of February, 2023). Once the organizers accept the document, the submission is considered to be complete.

## **2.17. COST REPORT DOCUMENTS**

### **2.17.1. ELECTRONIC COPY**

The upload of the Cost Report Documents (BOM, CBOM, DBOM, Cost Explanation File, Supporting Material) to the FS East website must be done according to the Static Rules chapter no later than the specified deadline (the deadline will be published in the FS East Rules 2023 version 1.1, beginning of February, 2023). Once all steps have been completed, the submission of the Cost Report Documents is considered to be complete.

### **2.17.2. WRITTEN COPY**

Do not send the Written Copy by post; it must be present at the Cost and Manufacturing Event of the team.

## **2.18. BUSINESS PLAN DOCUMENTS**

### **2.18.1. BUSINESS PLAN PITCH VIDEO**

Teams who would like to submit a video should upload it to Youtube as a Public or Unlisted video, and the link of the video should be submitted to the FSEast website.

### **2.18.2. BUSINESS PLAN PRESENTATION - ELECTRONIC COPY**

The Business Plan Presentation - Electronic Copy of the slides must be submitted at the FS East website at the above specified deadline.

## 2.19. TEAM MEMBER DESIGNATION AND HEALTH INSURANCE CERTIFICATE

All team members must register at [login.fseast.eu](http://login.fseast.eu) (details will be announced later).

In order to get added to the team's profile, team members must select their team from the given list, which will be accepted by the team captain. The actual participating team members must be designated prior to the event by the team captain at [login.fseast.eu](http://login.fseast.eu).

During the team member registration at [login.fseast.eu](http://login.fseast.eu), all team members must upload a Health Insurance Certificate in .jpg or .png format, as well as provide the document's expiration date. In case the health insurance data of one or more team members is incorrect, FS East will decline the designation of the team member(s) in question. Only designations of team members with complete and correct health insurance information will be accepted.

## 3. TECHNICAL RULES

### 3.1. GENERAL VEHICLE REQUIREMENTS AND RESTRICTIONS

#### 3.1.1. TIRES

*Specific FS East addition to Rules 2023 T2.6.4*

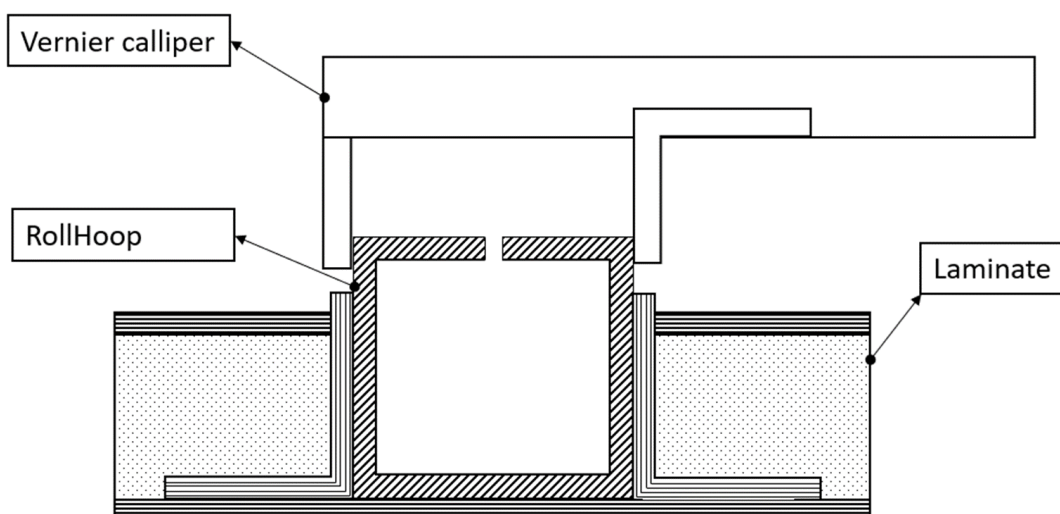
Using a special agent on a tire for any dynamic event will result in a complete exclusion from the Dynamic events.

#### 3.1.2. INSPECTION HOLES

*Specific FS East completion to Rules 2023 T3.7.6*

Inspection holes must be located so that the outside diameter can be measured ACROSS the inspection hole with a vernier caliper, i.e. there must be access for the vernier calliper to the inspection hole and to the outside of the tube one hundred eighty degrees (180°) from the inspection hole.

For a fully laminated front hoop a cutout must be made so the outer dimensions (tube or square cross section) can be measured as well i. e there must be access for the vernier caliper to the hoop without touching any laminate.



### **3.1.3. FIREWALL PROTECTION**

*Specific FS East addition to FSG Rules 2023 T4.8.4*

At the contactpoint of the floor of the cockpit and the firewall no gap is allowed up to a height of 20mm. Fire resisting tapes or non rigid materials are allowed to seal minor gaps but it is not allowed to replace structural elements.

### **3.1.4. GAS CYLINDER/TANK AND THE PRESSURE REGULATOR PROTECTION**

*Specific FS East addition to FSG Rules 2023 T9.1.1.*

The gas cylinder/tank and the pressure regulator must be located at least 50mm from any exhaust system component.

### **3.1.5. WIRE MOUNTING IN BATTERY PACKS**

*Specific FS East completion to Rules FSG 2023 T11.7.7 and EV 5.4*

The LV and HV wiring have to be mechanically unloaded and tension free, no additional weight is allowed to be attached to the cables except coatings and bonding. Relays, switching devices have to be mechanically fixed to a rigid surface.

### **3.1.6. VEHICLE IDENTIFICATION**

#### **3.1.6.1. TECHNICAL INSPECTION STICKER SPACE**

*Specific FS East change of Rules 2023 IN1.3*

The FS East technical inspection sticker will be placed on the nose of the car directly in front of the cockpit opening. A space 100 mm tall x 180 mm wide must be made available for this sticker.

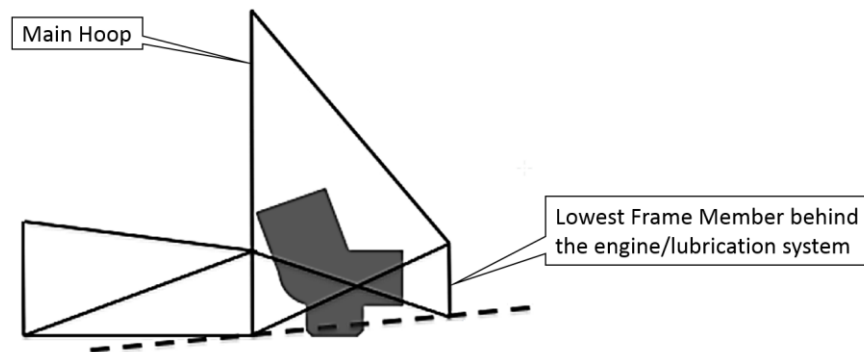
Vehicles that are being entered into multiple competitions in the FSAE series must allow sufficient space along the nose centerline for all inspection stickers.

## **3.2. SPECIAL REQUIREMENTS AND RESTRICTIONS FOR INTERNAL COMBUSTION ENGINE VEHICLES**

### **3.2.1. ENGINE LUBRICATION SYSTEM**

Specific clarification of FSG Rules 2023 T 7.3.1

The lowest point of any lubrication system can only be lower than the line between the lowest point of the main hoop and the lowest chassis member behind the lubrication system if it is protected from hitting the ground by a structure mounted directly to the chassis. Both the lowest chassis member used as reference point, and the mounted structure must meet T 3.2.



### 3.3. SPECIAL REQUIREMENTS AND RESTRICTIONS FOR ELECTRIC VEHICLES

#### 3.3.1. TSAC EVENING STORAGE

TSAC will not be stored in the team's pits during the evening. The TSAC will be stored in open-air in front of the team's pit on the handcart. The team must bring their own weatherproof container/box to provide protection of the TSAC (on the handcart) from weather events during the evening. The quality of this item will be checked during the TS Accumulator Inspection.

#### 3.3.2. LI-ION SPECIFIC FIRE EXTINGUISHER

*Specific FS East addition to FSG Rules 2023 T13.4*

One of the fire extinguishers mentioned in T13.4.1 could be replaced by a gel based (Class A) fire extinguisher dedicated for lithium battery fires.

One of the fire extinguishers - preferably a gel based one - must always accompany the TSAC whenever it is outside of the car.

#### 3.3.3. TS ACCUMULATOR INSTALLATION

Whenever the TS Accumulator is installed in the car, the car shall be on the ground with wheels mounted and shall be easily moveable to remove it from the pits.

The exit of the pit must be left free at all times.

### **3.3.4. TS ACCUMULATOR IN TEAM'S PIT**

Whenever the accumulator is inside the team's pit on the hand cart it has to be stored by the UNOBSTRUCTED pit exit at all times, with the handle facing outside.

### **3.3.5. TS ACCUMULATOR CHARGING**

A mandatory resting area will be available at the event and after charging 60 minutes must be spent there before the TS Accumulator can be installed to the car.

### **3.3.6. DATA LOGGER**

The Data Logger will be provided by FS East. Data Logger Specification will be available on the FS East website.

### **3.3.7. CURRENT AND VOLTAGE LIMIT VIOLATIONS**

*Specific FS East addition to FSG Rules 2023 EV2.2*

Besides the power limit stated in the FSG rules the Data Logger data will be checked against the maximum accumulator charge and discharge currents stated in the ESF,

The data will also be checked for the maximum tractive system voltage.

### **3.3.8. GROUNDING CHECKS**

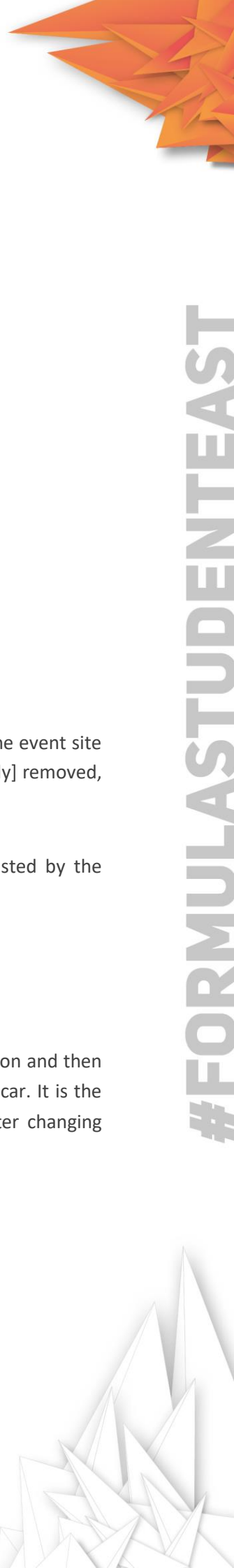
*Specific FS East addition to FSG Rules 2023 EV3.1*

All parts that are conductive or may be conductive, that the driver can touch, and all conductive parts that may be in contact with a pedestrian must be grounded.

### **3.3.9. HVD REMOVAL**

*Specific FS East addition to FSG Rules 2023 EV4.8.2*

An untrained person wearing proper high voltage insulating gloves must be able to remove the HVD within 10 s when the vehicle is in ready-to-race condition. The gloves must not be damaged during the process.



### **3.3.10. TSAL ATTACHMENT**

*Specific FS East addition to FSG Rules 2023 EV4.10.7*

The TSAL and all parts of it must be rigidly mounted.

### **3.3.11. DEVICE TO BE USED FOR CHECKING CELL TEMPERATURE**

*Specific FS East addition to FSG Rules 2023 EV5.8.6.*

FS East will not install a monitoring device for temperature monitoring.

## **3.4. TECHNICAL INSPECTION - GENERAL REQUIREMENTS**

### **3.4.1. INSPECTION & TESTING REQUIREMENT**

*Specific FS East addition to FSG Rules 2023 IN 1*

Before passing all parts of technical inspection, the car may only be moved around on the event site with all detachable keys of the Master Switches [all vehicles] and HVD [EV and DV-EV only] removed, ASMS and TSMS locked.

Broken seals must only be replaced by a scrutineer, but scrutineering may be requested by the scrutineer due to the broken seal.

### **3.4.2. CAR WEIGHTING**

*Specific FS East addition to FSG Rules 2023 IN 8*

If the car weight changes by more than 5 kg, the car must be presented for tech inspection and then re-weighed. Re-weighing is not possible after entering the first dynamic event with the car. It is the team's responsibility to have the car re-weighed before entering a dynamic event after changing parts.

### **3.4.3. BRAKE TEST**

*Specific FS East addition to FSG Rules 2023 IN 11*



The brake system will be dynamically tested and must demonstrate the capability of locking all four (4) wheels *at the same time* and stopping the vehicle in a straight line at the end of an acceleration run specified by the brake inspectors.

Side of the tyres may be marked by the inspectors for better visual identification.

Half rotation difference between the front and rear axle allowed

Brake pumping is forbidden. The tyres must stay locked up until the car is fully stopped

#### **3.4.4. BOTS TEST**

*Specific FS East addition to FSG Rules 2023 T 6.2*

In case the actuation of the BOTS during a failure of the brake system is not apparent and not documented (video, CAD cinematic, pictures) sufficiently, a brake failure will be simulated during technical inspection.

This will be tested by opening the brake bleeder nipple at the brake caliper in one of the two brake circuits. If the brake circuit is opened, the brake pedal must actuate the BOTS in every situation (e.g. balance bar position).



### 3.5. TECHNICAL INSPECTION PROCEDURE

The following steps need to be passed during the technical inspection, according to classification of the car.

		EV	CV	DV
<b>Static Technical Inspection</b>	EV1 Inspection	X		X(EV Only)
	TS Accumulator Inspection	X		X(EV Only)
	Mechanical Inspection	X	X	X
	EV2 Inspection	X		X(EV Only)
	Autonomous System Inspection			X
	Driver Egress & Safety Inspection	X	X	X
<b>Dynamic Technical Inspection</b>	Tilt Test	X	X	X
	Noise Test		X	X(CV Only)
	Rain Test	X		X(EV Only)
	Brake Test	X	X	X
	EBS Test			X

#### 3.5.1. STATIC TECHNICAL INSPECTION

The Static Technical Inspection is done in the Technical Inspection Tent. During the Static Inspections only team members with the provided identifier can participate. An exact number of these identifiers will be provided to each team by the organizers.

Photographers from the teams are not allowed to enter the Technical Inspection Tent. Official media content will be provided by FS East.

##### 3.5.1.1. EV 1 INSPECTION [EV ONLY]

Electrical technical inspection of the Low Voltage systems of the car. The TS accumulator must be outside of the car.

### 3.5.1.2. TS ACCUMULATOR INSPECTION [EV ONLY]

Technical inspection of the TS Accumulator and Charging systems of the car. Can be done independently from EV1. Teams also have to present all safety equipment and high voltage rated tools.

### 3.5.1.3. MECHANICAL INSPECTION

[EV only]: The TS accumulator must be outside of the car.

### 3.5.1.4. EV 2 INSPECTION [EV ONLY]

Electrical inspection of the Tractive System of the car. The car must be in ready-to-race condition, and every technical inspection stage mentioned before have to be passed to start the EV2 technical inspection. TS accumulator mounting and some other mechanical aspects will also be examined at this point.

### 3.5.1.5. DRIVER EQUIPMENT & DRIVER EGRESS

During the Driver Equipment Test, each team has to present every item listed in Rules 2023 IN2, and also demonstrate the driver emergency exit situation.

## 3.5.2. DYNAMIC TECHNICAL INSPECTION

The Dynamic Technical Inspection is done in the Dynamic technical inspection Area. During the Dynamic Inspections only team members with the provided identifier can participate. An exact number of these identifiers will be provided to each team by the organizers.

Photographers from the teams are not allowed to enter the Dynamic technical inspection Area. Official media content will be provided by FS East.

## 3.5.3. MAINTENANCE DURING TECHNICAL INSPECTION

If the team decides to fix any found issue during the inspection, they have a total 15 minutes maintenance time in the technical inspection pit, which is measured cumulatively. The team may be instructed by the scrutineers to leave the area if the found issue is deemed not fixable in 15 minutes. After 15 minutes the team must leave the area, exception can be given if there is no queue for the scrutineering slot.

## 4. STATIC EVENTS

During all static events (both initial and final judging) a team member may participate only in that team's event, which she/he is registered in. Universities participating with multiple vehicles are considered as separate, individual teams and each participant must be a member of one and only one team. Active participation on other teams' static event will be penalized. Enforcing this principle, the distinct static events of these teams will be scheduled in parallel, in the same time slot.

Universities participating in multiple categories with the same vehicle are counted as one team and their team members can participate in the events of both categories.

### 4.1. BUSINESS PLAN PRESENTATION EVENT

*Specific FS East rule addition*

Teams cannot submit the same business plan that they presented in a previous FSEast Event, regardless of the category. (E.g. 2022's DV business plan cannot be an EV business plan in 2023)

#### 4.1.1. BUSINESS PLAN DOCUMENTS

The Business Plan Presentation Event's documents consist of the following documents:

- Pitch Video
- Business Plan Presentation Electronic Copy

##### 4.1.1.1. PITCH VIDEO

Teams who would like to submit a video should upload it to Youtube as a Public or Unlisted video, and the link of the video should be submitted to the FSEast website. The length of the video is maximum 30 sec. The pitch video should be considered as the first impression of the business idea and has to contain the relevant investment figures and the business idea itself.

##### 4.1.1.2. BUSINESS PLAN PRESENTATION ELECTRONIC COPY

*Specific FS East rule addition*

All teams must submit the final version of their presentation no later than the given deadline. Teams cannot change their presentation (except: correcting typos) for the initial judging after their electronic copy is submitted.

#### **4.1.2. DEEP DIVE TOPIC**

All teams will receive the same specific Deep Dive Topic from the organizers prior to the competition, which has to be part of the ten minute presentation.

The topic with further information will be published on the FS East website no later than 4 weeks before the event.

#### **4.1.3. FINALISTS' DEEP DIVE TOPIC**

*Specific FS East rule addition*

Finalist teams will receive an additional Deep Dive Topic on the Finalists' Briefing that they should incorporate into their presentation on the Finals.

#### **4.1.4. JUDGING SEQUENCE**

At FS East Business Plan Presentation judging will consist of two parts for each category:

1. Initial judging of all teams
2. Final judging of top teams (the number of top teams will be decided by judges on-site)

The judges have the right to determine the number of teams participating in the final judging zero (0), ergo no teams will participate in the final. In this case the results are determined based on the initial judging.

Teams participating in the Business Plan Presentation Final will be informed about their participation during the event.

#### **4.1.5. BUSINESS PLAN PRESENTATION SCORING FORMULA**

There is a maximum of seventy-five (75) points from the FS East Business Plan Presentation Judging Score Sheet. The final score of a team is based on the average of the Judges' scoring sheets.

Each category is evaluated separately.

**NOTE:** If rounding - down or up - the average is needed, it will be decided by Judges in the given Judge Group on spot, before the Static Day ends.

The scoring for the non-finalist is calculated as followed:

$$\text{BPP\_SCORE} = 70 (P_{\text{team}} / P_{\text{max}})$$

$P_{\text{team}}$  is the score awarded to the team

$P_{\text{max}}$  is the highest score awarded to any team not participating in the finals

The scoring of the BPP finalists will vary from 75 to 71 points and is scored immediately after the BPP finals.

If there are 0 finalists in a category, the maximum score is 70 in that category.

#### 4.1.6. SCORESHEET FOR INITIAL JUDGING

Pitch video	5
Novelty	5
Content	20
Finances	20
Deep Dive Topic	10
Demonstration & Structure	10
Delivery	10
Q&A	15
General impression	5
<b>SUM</b>	<b>100</b>

#### 4.1.7. RESULT REVISION

After the initial evaluation the judges will review all cost reports and given scores. In case of debatable/questionable situations the final decision falls within the competence of the Business Plan Presentation Event Leader. The same rule applies for complaints.

## 4.2. COST AND MANUFACTURING EVENT

### 4.2.1. COST REPORT DOCUMENTS

The Cost Report Documents (CRD) consist of the following documents:

- The BOM including DBOM and CBOM created online on the Formula Student Germany website
- The supporting material file uploaded as a pdf file to the competition website
- The cost explanation file uploaded as a pdf file to the competition website

Two hard copies or a splittable folder of the CRD is allowed to be used at the discussion.

Without submitted electronic any of the Cost Report Documents a team will not be allowed to take part in the corresponding events (Discussion, Real Case presentation and Cost Understanding) and will receive a score of 0 (zero) for the Cost and Manufacturing Event.

#### 4.2.1.1. ELECTRONIC COPY

Prior to the competition, the Cost Report Documents (CRD) must be submitted to the competition website no later than the given deadline.

For the creation of the BOM, the teams have to use the CBOM tool available on the [www.formulastudent.de](http://www.formulastudent.de) website. This tool provides a printable \*.pdf version of the BOM.

All the three (3) CRD should be uploaded as separate documents in \*.pdf file. For submission all the CRD files must be compressed into one (1) \*.zip file.

Filename nomenclature:

- CAR#\_CRD.zip (e.g. 01\_CRD.zip) for the zip archive.
- CAR#\_BOM.pdf (e.g. 01\_BOM.pdf) for the Bill of Materials.
- CAR#\_SUP\_MAT.pdf (e.g. 01\_SUP\_MAT.pdf) for Supporting Material.
- CAR#\_COST\_EXPL.pdf (e.g. 01\_COST\_EXPL.pdf) for the Cost Explanation.

**NOTE:** Incomplete submissions (e.g. only the BOM) will be counted as not submitted. Only with all three (3) parts accomplished the submission of the Cost Report is complete. A team can decide not to submit a Supporting Material at the price of losing points, in which case they should upload an empty \*.pdf file with the correct nomenclature.

**NOTE:** Failure to meet the nomenclature requirements results in a maximum of minus three (-3) points.

## 4.2.1.2. WRITTEN COPY

The written copies must be identical to the electronic copies (the full report). The written copy must be presented during the discussion part of the Cost and Manufacturing Event. The hard copy must be identical to the uploaded version, otherwise five (5) penalty points will be deducted from the team's Cost and Manufacturing Event score.

## 4.2.2. JUDGING SEQUENCE

At FS East Cost and Manufacturing Event Judging will consist of two parts for each category:

1. Initial judging of all teams
2. Final judging of top teams (the number of top teams will be decided by judges on-site)

The judges have the right to determine the number of teams participating in the final judging zero (0), ergo no teams will participate in the final. In this case the results are determined based on initial judging.

Teams participating in the Cost and Manufacturing Event Final will be informed about their participation during the event.

## 4.2.3. COST AND MANUFACTURING SCORING FORMULA

The overall Cost and Manufacturing Event maximum scoring is 100 points.

5	Format and Accuracy of Documents
5	Knowledge of Documents and Vehicle
35	BOM and BOM discussion
35	Cost understanding
20	Real case

Each category is evaluated separately.



Non-finalist

$$\text{CME score} = (P_{\text{your}}/P_{\text{max}}) \times (100-n)$$

Where:

“P<sub>max</sub>” is the highest score awarded to any team in the given category not participating in the finals

“P<sub>your</sub>” is the score awarded to your team

“n” is the number of finalists in the given category (NOTE: n can be 0 as well)

Finalists

$$\text{CME score} = 100-(n-1)$$

Where:

“n” is the place achieved in the Cost and Manufacturing Event Final

#### 4.2.4. RESULT REVISION

After the initial evaluation the judges will review all cost reports and given scores. In case of debatable/questionable situations the final decision falls within the competence of the Cost and Manufacturing Event Leader. The same rule applies in case of complaints.

### 4.3. ENGINEERING DESIGN EVENT

#### 4.3.1. ENGINEERING DESIGN DOCUMENTS

The Engineering Design Documents consist of the following documents:

- Engineering Design Report (EDR)
- [DV only] Autonomous Design Report (ADR)
- Design Spec Sheet (DSS)

These documents must be uploaded to the FS East website no later than the given deadline.

Without the successful submission of all documents (2 for CV and EV, 3 for DV) a team might not be allowed to take part in the Engineering Design Event and might be given a score of zero (0) for the whole event. The submission is considered to be successful if the organizers have checked if the documents fulfill the formatting and content requirements and they have accepted them.



In case of formatting and naming errors in the documents penalty can be applied up to a maximum of -10 (minus ten) points for CV/EV and -20 (minus twenty) points for DV, which will be deducted from the Engineering Design score after the Engineering Design Final.

Filename nomenclature:

- CAR#\_EDR.pdf (e.g. 01\_EDR.pdf) for the Engineering Design Report.
- CAR#\_ADR.pdf (e.g. 01\_ADR.pdf) for the Autonomous Design Report. [DV only]
- CAR#\_DSS.pdf (e.g. 01\_DSS.pdf) for the Design Spec Sheet.

#### 4.3.1.1. ENGINEERING DESIGN REPORT (EDR)

The Engineering Design Report must be submitted in a single Adobe Acrobat® (\*.pdf) file. The documents must be prepared according to the FSG Rules 2023 Article S3.2.

The EDR must not exceed ten pages, consisting of not more than seven pages of content (text, which may include pictures, graphs, tables, etc.) and three pages of drawings. The three EDR drawings must show the vehicle from **front, top and side views**. Additional detailed views, cross-sections can appear on the drawings. Each of the three drawings must appear on a **separate page**. Pay attention to the quality of the drawings, follow the general rules of **engineering drawings**. Photos, renders, screenshots of the CAD software are not meeting the requirements. The function of the EDR is to provide information from one engineer (the designer) to another engineer (the judge), the content and the drawings must serve this function. For further formatting directives see FSG Rules 2022 Articles S3.2.2 - S3.2.8.

The size of the document must not exceed five megabytes (5MB). A properly sized document will be much smaller than five megabytes in file size. Please ensure that graphs and photos within the Acrobat file are of an appropriate resolution.

#### 4.3.1.2. [DV ONLY] AUTONOMOUS DESIGN REPORT (ADR)

The Autonomous Design Report must be submitted in a single Adobe Acrobat® (\*.pdf) file. The document must be written as a scientific paper and must not exceed five pages.

The ADR should contain a description of the autonomous system with a review and derivation of the team's design objectives. Any information to scope, explain or highlight design features, concepts, methods or objectives to express the value and performance of the autonomous system to the judges shall be included at the team's discretion.

The size of the document must not exceed five megabytes (5MB). A properly sized document will be much smaller than five megabytes in file size. Please ensure that graphs and photos within the Acrobat file are of an appropriate resolution.

#### 4.3.1.3. ENGINEERING DESIGN SPEC SHEET (DSS)

The Design Spec Sheet must be submitted in a single Adobe Acrobat® (\*.pdf) file. The FS East DSS template and further information will be published on the FS East website. The template must not be altered or reformatted prior to submission. In the DSS metric units must be used only.

#### 4.3.2. JUDGING SEQUENCE

At FS East Engineering Design Judging will consist of two parts for each category:

1. Initial judging of all teams
2. Final judging of top teams (the number of top teams will be decided by judges on-site)

The judges have the right to determine the number of teams participating in the final judging zero (0), ergo no teams will participate in the final. In this case the results are determined based on initial judging.

Teams participating in the Engineering Design Final will be informed about their participation during the event.

#### 4.3.3. ENGINEERING DESIGN SCORING

The overall Engineering Design Event maximum scoring is 150 points for CV/EV and 300 points for DV. Each category is evaluated separately.

**NOTE:** All categories as mentioned in FSG Rules 2023 Article S3.7.2 will be evaluated, but the score-sheet structure and the content of it will differ from FSG Rules 2023, as it will be prepared by the FS East organizers prior to the Event.

#### 4.3.4. RESULT REVISION

After the initial evaluation the judges will review all cost reports and given scores. In case of debatable/questionable situations the final decision falls within the competence of the Engineering Design Event Leader. The same rule applies for complaints.

## 5. DYNAMIC EVENTS

As defined in the FSG Rules 2023 Part D.

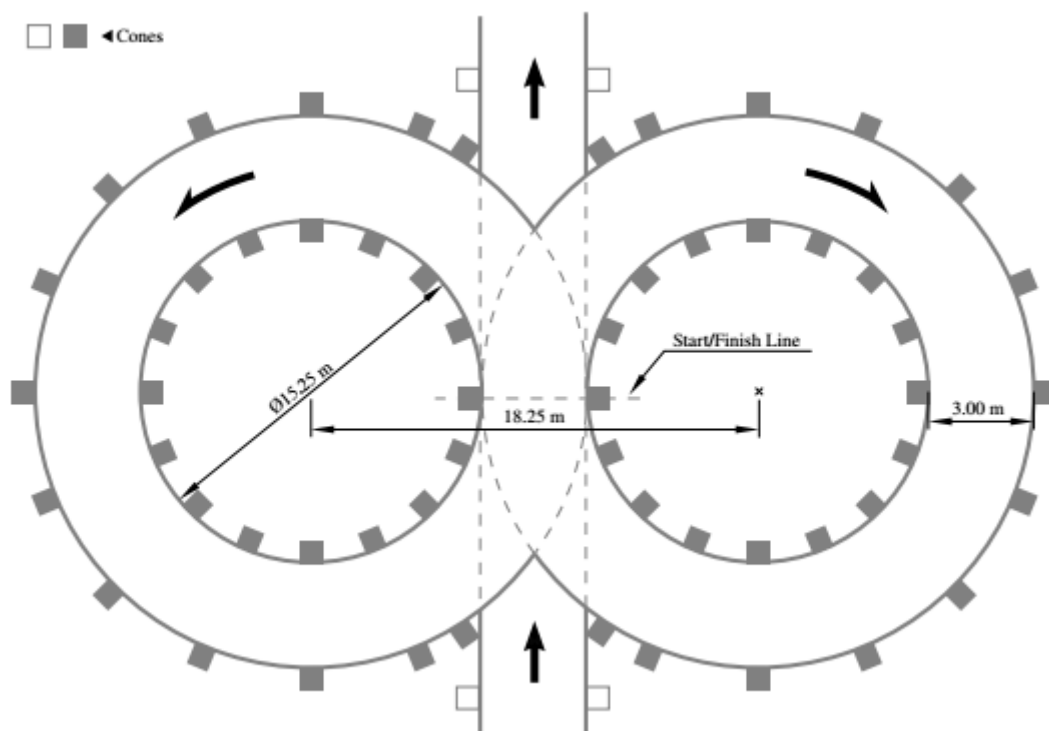
Only those people can enter the Dynamic Area during the Event, who are wearing long trousers (excluding stretch and nylon pants) and closed shoes on their legs, due to safety reasons. Only 4 team members per team are allowed to enter the Dynamic Area, including the driver.

### 5.1. SKIDPAD EVENT

#### 5.1.1. SKIDPAD TRACK LAYOUT

As defined in the FSG Rules 2023 Part D 4.1.

This means that the skidpad layout will be the original 8 - shape layout.



Track layout for Skidpad Event

#### 5.1.2. SKIDPAD PROCEDURE

As defined in the FSG Rules 2023.D4.2 for EV and CV vehicles and FSG Rules 2023 D4.3 for DV vehicles

## 5.1.3. SKIDPAD SCORING

For CV and EV vehicles as defined in the FSG Rules 2023 D4.4 except D4.4.3.

The calculation of the points are the following:

If a team's run time including penalties is below  $T_{max}$ , additional points based on the following formula are given:

$$SKIDPAD\_SCORE = 71.5 \left( \frac{\left( \frac{T_{max}}{T_{team}} \right)^2 - 1}{0.5625} \right)$$

$T_{team}$  is the team's best run time including penalties.

$T_{max}$  is 1.25 times the time of the fastest vehicle including penalties

For DV vehicles as defined in the FSG Rules 2023 D4.5 except D4.5.3.

The calculation of the points are the following:

If a team's run time including penalties is below  $T_{max}$ , additional points based on the following formula are given:

$$SKIDPAD\_SCORE = 71.5 \left( \frac{\left( \frac{T_{max}}{T_{team}} \right)^2 - 1}{1.25} \right)$$

$T_{team}$  is the team's best run time including penalties.

$T_{max}$  is 1.5 times the time of the fastest vehicle including penalties.

## 5.2. ACCELERATION EVENT

### 5.2.1. ACCELERATION TRACK LAYOUT

As defined in the FSG Rules 2023.D5.1

### 5.2.2. ACCELERATION PROCEDURE

As defined in the FSG Rules 2023.D5.2 for EV and CV vehicles and FSG Rules 2023 D5.3 for DV vehicles

### 5.2.3. ACCELERATION SCORING

For CV and EV vehicles as defined in the FSG Rules 2023 D5.4.1 and the following:

If a team's best time including penalties is below  $T_{max}$ , additional points based on the following formula are given:

$$ACCELERATION\_SCORE = 71.5 \left( \frac{\frac{T_{max}}{T_{team}} - 1}{0.5} \right)$$

$T_{team}$  is the team's best time including penalties.

$T_{max}$  is 1.5 times the time of the fastest vehicle including penalties.

For DV vehicles the calculation of the points are the following:

If a team's best time including penalties is below  $T_{max}$ , additional points based on the following formula are given:

$$ACCELERATION\_SCORE = 71.5 \left( \frac{T_{max}}{T_{team}} - 1 \right)$$

$T_{team}$  is the team's best time including penalties.

$T_{max}$  is 2 times the time of the fastest vehicle including penalties .

### 5.3. AUTOCROSS EVENT

As defined in the FSG Rules 2023.D6

### 5.4. ENDURANCE AND EFFICIENCY EVENT

As defined in the FSG Rules 2023.D7 except D7.8.4.

The calculation of the points for the endurance scoring are the following:

$$ENDURANCE\_SCORE = 300 \left( \frac{\frac{T_{max}}{T_{team}} - 1}{0.333} \right)$$

$T_{team}$  is the team's corrected elapsed time.

$T_{max}$  is 1.333 times of the corrected elapsed time of the fastest vehicle

## 5.5. DRIVERLESS EVENTS

Driverless Autocross Event takes place on the same track as Driverless Trackdrive Event.

Driverless Autocross and Driverless Trackdrive Event will be the same in the Event Schedule, teams can choose, whether they start their Autocross or their Trackdrive Run, when entering the track.

Previously collected data must be deleted before the Autocross and Trackdrive Event.

Refueling is needed before starting the Trackdrive Event.

Every team has 5 minutes to prepare the car, where the marshalls measure the time. If the vehicle cannot start its run in 5 minutes, the team must leave the area, no DNF awarded. If the car moves, then suddenly stops, DNF will be awarded.

For DV Autocross, the last team must enter the area before 15 minutes to Event Closing. After their run, the event will be closed, even though there are minutes from Official Event Closure.

For DV Trackdrive, the last team must enter the area before 20 minutes to Official Event Closure. After their run, the event will be closed, even though there are minutes from Official Event Closure.

### 5.5.1. ADDITIONAL FS EAST-SPECIFIC REMARKS

Pit Rules will be detailed in the Event Handbook.

The schedule for the dynamic events will be shown in the Event Handbook. The last team that is allowed to start the run is the one that stands at the starting line before the scheduled time is over. This team is allowed to finish its runs. Teams standing in the row at closing time are not allowed to

start their run. At the entrance of the test tracks, the skidpad, acceleration and autocross track, a CLOSED sign will be placed with the scheduled ending time.

For Driverless Teams, preparation must finish at least 5 minutes before the scheduled closing time. Vehicle must be in a running state 5 minutes before the closing time. These teams are allowed to finish their run, no other teams are allowed to participate.

### 5.5.2. DRIVERLESS EVENT TRACK LAYOUT

The Trackdrive layout is a closed loop circuit built to the following guidelines:

- Straights: No longer than 80m
- Constant Turns: up to 50m diameter
- Hairpin Turns: Minimum of 9m outside diameter (of the turn)
- Miscellaneous: Chicanes, multiple turns, decreasing radius turns, etc.
- The minimum track width is 3m

The length of one lap is approximately 200m to 500 m.

### 5.5.3. TRACK MARKING

The markings of all dynamic events will have the following characteristics:

- The track is marked with cones.
- The left borders of the track are marked with small blue cones.
- The right borders of the track are marked with small yellow cones.
- Exit and entry lanes are marked with small orange cones.
- Big orange cones will be placed before and after start, finish and timekeeping lines.
- If not defined otherwise in chapter D of the rules, the maximum distance between two cones in driving direction is 5m. In corners, the distance between the cones is smaller for a better indication.
- The start, finish and timekeeping lines as well as keep out zones around the timekeeping equipment may be marked.
- Additionally for skid pad and trackdrive, track limit lines on either side of the track and entry/exit lanes may be marked.
- There are no track limit lines for acceleration and Emergency Brake System (EBS)-test.



The cones used at the competition are equal to the cones listed in Table 3 despite that there will be letters "FSG" on the black/white band of the cones (white/black respectively).

The manufacturer WEMAS6 does not sell the cones to end customers, but they may be purchased from [baustellenabsicherung24.de](http://baustellenabsicherung24.de)7.



big orange cone  
two white stripes

WEMAS  
307.610500.00.00

285 mm × 285 mm × 505 mm  
1.05 kg



small orange cone  
single white stripe

WEMAS  
400.000013.00.00



small yellow cone  
single black stripe

WEMAS  
400.000013.01.10

228 mm × 228 mm × 325 mm  
0.45 kg



small blue cone  
single white stripe

WEMAS  
400.000043.00.00

Table 3: Cone specs

There are the following limitations mainly resulting from the Hungaroring track conditions and organizational/authorizational issues:

- The lines may not be perfectly and continuously drawn.
- There may be further markings, to those mentioned above, that are not part of the track (e.g. markings, including cone position markings, lines from other events or different colored surface, etc.) on or close to the track which will not be removed by the officials.
- There may be (stacked) spare cones standing/lying at the trackside at a distinguishable distance.
- No special artificial landmarks are provided by officials. The team must not place additional landmarks on the track or inside the dynamic area.
- No map data is provided by the officials.

#### **5.5.4. DRIVERLESS AUTOCROSS PROCEDURE**

There will be a track walk prior to the autocross. During the track walk no equipment (e.g. antennas, sensors, cameras, etc) other than analog measurement devices (i.e. measurement wheel or measurement tape) is allowed.

At the Autocross Event each team has at least two runs consisting of one single lap. The final number of runs will be published before the start of the event.

The starting order is based on the time the team arrives at the autocross event. Teams on their first run will receive priority.

Staging - The vehicle is staged such that the front wheels are 6m in front of the starting line on the track.

Starting - A go-signal from RES is used to indicate the approval to begin. Timing starts after the vehicle crosses the starting line.

After the run the vehicle must come to a full stop within 30m behind the finish line on the track and enter the finish-state described in T14.10.

#### **5.5.5. DRIVERLESS AUTOCROSS SCORING**

As defined in the FSG Rules 2023.D6.5

#### **5.5.6. DRIVERLESS TRACKDRIVE PROCEDURE**

Starting order may be defined by the officials, based on previous dynamic event results.

Before starting a run, each vehicle with a fuel tank (CV), must be filled to the fuel level line (see CV2.6.3, "Fuel Level Line") at the fueling station. During fueling, once filled to the

scribe line, no shaking or tilting of the tank, the fuel system or the entire vehicle is allowed.

There will be a maximum of two runs, each run consisting of ten laps. The number of runs and the starting order procedure will be announced before the start of the event.

Staging - The vehicle is staged such that the front wheels are 6m in front of the starting line on the track.

Starting - A go-signal from RES is used to indicate the approval to begin. Timing starts after the vehicle crosses the starting line.

After ten laps the vehicle must come to a full stop within 30m behind the finish line on the track and enter the finish-state described in T14.10.

There will be no last lap signal i.e. the vehicle should count laps itself.

The team must proceed directly to the fueling station (vehicles with internal combustion engine only).

### **5.5.7. DRIVERLESS TRACKDRIVE SCORING**

As defined in the FSG Rules 2023.D8.4

## **5.6. SPECIAL ADDITION TO THE FSG RULES 2023**

### **5.6.1. PASSING**

The passing rules do not apply to vehicles that are stopped on track or vehicles that have spun out and are not moving. When passing a stationary vehicle, it is critical to slow down, drive cautiously and to follow the instructions from the track marshals.

**NOTE:** Overtaking on any section of the track except passing zones is still not allowed.

**NOTE:** If you notice any problem causing that you have to stop, please leave the ideal line.

### **5.6.2. ENDURANCE WAITING QUEUE**

Important: In order to have equal and fair conditions during the Endurance event at least 3 cars have to be on the track during the whole time of the Endurance event.

Therefore the Organisers will maintain a waiting queue of 3 teams. It is the team's responsibility to arrive in the waiting queue before the deadline -which will be announced for each team in the loudspeakers 15 minutes before the deadline. A delay will be penalised with 2 minutes penalty and the team will be able to start only at the end of the endurance event.

**NOTE:** According to experience of earlier years Formula Student events, it is expected to have sudden need for new teams in the waiting queue in the first section of the endurance event due to early DNFs. Please be prepared to attend the queue on time!

### **5.6.3. ENDURANCE TRACK LENGTH**

The full length of the Endurance event will be approximately 22 km.

The Endurance and Autocross track will be laid out with cones. In the straights, the distance between two cones will be 8-10 m in driving direction, and in some straights, the track width could be 3-8 m.

### **5.6.4. FUEL**

FS East offers two types of fuels for teams.

1. Gasoline, RON 100
2. MOL Racing Fuel DRX (ethanol 85%, with 15% RON 106 maingrade gasoline). Details can be found at [www.fseast.eu](http://www.fseast.eu)

Teams should come to the FS East 2023 event with empty fuel tank. It is not possible to empty the fuel tank in the FS East Pits. Measuring the ethanol ratio of the fuel is not allowed at the event site, further details of the provided fuel can be found at [www.fseast.eu](http://www.fseast.eu).

Teams must fill the tank fully at the first time.

In case of the suspension of the endurance, teams are allowed to have the engine heating procedure again. In this case, the fuel must be fueled top before the endurance starts again.

## 5.6.5. TIMEKEEPING

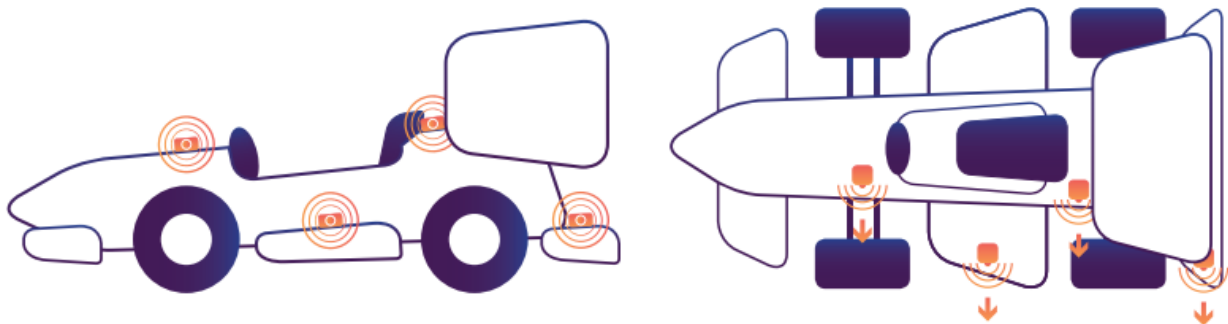
Transponders will be provided by FS East Event.

Transponders have to be mounted by the teams and it must not be removed until the competition ends, since it is vital for the timekeeping system

Transponders must be placed safely (securely attached, protected from debris and hot surfaces) on the left side of the vehicle (preferably on the nose cone, sidebox or diffuser) for timekeeping.

Important: Transceiving surface of the transponder must not be faced to the ground, but point to the left parallelly to the ground and perpendicularly to the centerline of the vehicle. The transceiving surface must not be obscured by any parts of the vehicle.

The picture below introduces the possible mounting positions:



## 5.6.6. DRIVING BACK TO THE DRIVER CHANGE AREA

Cars, that finish Endurance / Autocross Event or coming to the Driver Change Area to change drivers, shall drive to the Driver Change Entrance line with race - speed, without holding up any other racing participants. Cars shall reduce their speed at the Driver Change Area entrance. Drivers, who does not obey this rule (determined on the Race Leader Officials viewpoint), will get a 15 second time penalty in addition to their sum Endurance / Autocross Time.

In case of obvious slowing - down of any race car, when slow speed reduction can be harmful for other cars' racing, officials have the right to show Meatball flag for the slow car, in order to examine it in the Driver Change Area.

#### **5.6.7. FLAG USAGE IN CASE OF BURNING CARS**

In case of track marshals notice major failure with the vehicle , yellow flags and STOP tables will be shown by the organisers. Drivers must stop the vehicle at the side of the track in a safe place.

## 6. CHANGELOG

November 2022 - Version 1.0

1st release

Version 1.0

Version	Date	Modification	Page
1.0	November 2022	Initial release	-



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