

FORMULA STUDENT EAST RULES 2022

#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 2022 will allow vehicles with conventional internal combustion engines (gasoline or ethanol fueled) 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 2022 document (hereafter “FSG Rules 2022”) published by Formula Student Germany (<https://www.formulastudent.de/>) and FS CV Hybrid Rules Extension 2022 published by Formula Student East (<https://fseast.eu/>) and other competitions. In case of a conflict between the above mentioned documents and the FSEAST Rules 2022, the FSEAST Rules 2022 supersede the FSG Rules 2022.

Abbreviations used in this document

Abbreviations used	Name
FSEAST Rules 2022	FS EAST Rules
FSG Rules 2022	FS Rules
CV Hybrid Rules 2022	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
SES	Structural Equivalency Spreadsheet
TMD	Team Member Designation
VSV	Vehicle Status Video

2. GENERAL

2.1. COMPETITION DATES AND PLACE

FS East 2022 will be held between 7th and 13th August, 2022 at the Hungaroring motorsport racetrack, in Mogyorod, Hungary.



2.2. FS EAST RULES 2022

The Formula Student East 2022 competition is compliant with the '*Formula Student Rules 2022*' document (hereafter '*FSG Rules 2022*') published by Formula Student Germany (<https://www.formulastudent.de/fsg/rules/>) and '*FS CV Hybrid Rules Extension 2022*' document (hereafter '*CV Hybrid Rules 2022*') published by Formula Student East (<https://fseast.eu/>) and other competitions.

The here presented *FS East Rules 2022* 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 2022*, the *FS East Rules 2022* 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 2022.

2.3. CATEGORIES AND SCORING

Formula Student East 2022 will allow vehicles with conventional internal combustion engines (gasoline or ethanol fueled) 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 2022* are competing in the CV category.

	CV & EV	DV
Static Events:		
Business Plan Presentation	75 points	75 points
Cost and Manufacturing	100 points	100 points
Engineering Design	150 points	300 points
Dynamic Events:		
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 2022* regardless of the drivetrain and they are registered for the DV category in FS East 2022, 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 2022 and FSG Rules 2022 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. Do not ask about more than one rule per mail.

2.6. OFFICIAL LANGUAGE

The FS East 2022 official language is English.

2.7. OFFICIAL TIME

The FS East 2022 official time:

From	Till	Time
31 October 2021	27 March 2022	Central European Time (CET)
28 March 2022	30 October 2022	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 2022 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 dedicated number of slots during the first period of the registration procedure.

2.8.1. IMPORTANT DATES

Main dates:	From:	To:
Team Registration	21th of January 22:00 CET	28th of January 10:00 CET
Event Registration Quiz	28th of January 11:00 CET	28th of January 16:59 CET
Quiz Protest Period	28th of January 17:00 CET	28th of January 23:59 CET
Periods	From:	To:
Event Registration Period 1	28th of January 11:00 CET	30th of January 23:59 CET
Event Registration Period 2	31st of January 00:00 CET	1st of February 23:59 CET
Event Registration Period 3	2nd of February 00:00 CET	31st of May 19:59 CET



2.8.2. TEAM REGISTRATION - GETTING YOUR UNIQUE ID'S 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. The rest of team members can join the already created team once they registered.
3. After the Team Registration a confirmation email will be sent with the data.

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 2022 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 28th of January 10:00 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 (e.g. 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 and pass the quiz in both categories
- Both registration fee have to be paid
- They have to pass the DV scrutineering process to participate in the dynamic events



- If the DV scrutineering 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 car after scrutineering 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 two separate business presentations. One for the CV/EV category One for the DV category
 - The business case behind the presentations (=the numbers) may be the same for the two presentations if they are properly supported and if they are applicable for both categories
 - The presenters can be the same for the 2 presentations, the timeslots will not overlap each other, but it may happen that the two presentations will be scheduled after each other.
 - It may happen that one or all of the judges will be the same for the presentations.
 - 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://login.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 2022 competition opens slots for 24 combustion 36 electric and 24 driverless teams. The organizers will handle the documents of maximum 6 combustion 8 electric and 6 driverless waiting list teams.

FS East 2022 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

FS East 2021 Top 3 teams per category, the highest ranked Hungarian team per category and the Top 30% of teams in FS Online 2021 are invited as pre-registered teams.

List ABCD - cv:

1. Rennstall Esslingen - FS East 2021
2. Rennteam Uni Stuttgart e.V. - FS East 2021
3. CTU CarTech - FS East 2021
4. Arrabona Racing Team - FS East 2021
5. Team Bath Racing - FS Online 2021
6. BME Motorsport - FS Online 2021
7. Pravega Racing - FS Online 2021

List ABCD - ev:

1. AMZ electric - FS East 2021
2. GreenTeam Uni Stuttgart Electric - FS East 2021
3. BME Formula Racing Team - FS East 2021
4. TU Graz Racing Team - FS Online 2021
5. eForce FEE Prague - FS Online 2021

List ABCD - dv:

1. KA-RaceIng Driverless - FS East 2021
2. Starkstrom Augsburg Driverless - FS East 2021
3. Ecurie Aix Formula Student Team RWTH Aachen - FS East 2021
4. Winner of FS Online 2021 overall (to be notified)

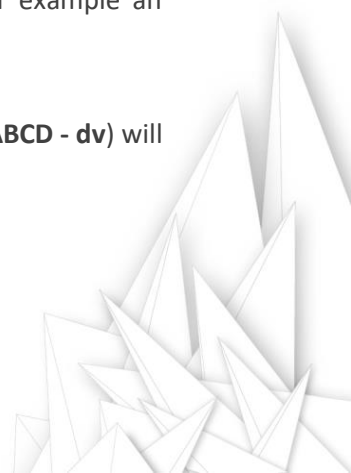
For these teams this opportunity is open until 4th of February, and their registration will be accepted if they pay the registration fee before 15:00 on 30th of January.

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.

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.

Registration fee:

CV: 1700 EUR + VAT (+27%)

EV: 1900 EUR + VAT (+27%)

DV: 2200 EUR + VAT (+27%)

VAT-free payment is only acceptable from teams with a valid EU VAT number. In case your team doesn't have an EU VAT number, please transfer the full amount including the 27% VAT.

You are able to request a proforma invoice before payment at hello@fseast.eu.

After the quiz results are fixed, every team on the starter list has 2 days 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 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: Járműmérnökök Egyesülete

Account Holder Address: H-9027, 8th Puskás Tivadar Street, Győr, 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 CANCELLED

Cancelling 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 the General 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

Cancelling until 31th March 2022 - 90% Refund

Cancelling until 31th May 2022 - 60% Refund

Cancelling until 30th June 2022 - 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.

2.8.8.3. PAYMENT INFORMATION FOR TEAMS ON THE WAITING LIST

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

CV: 500 EUR + VAT (27%)

EV: 600 EUR + VAT (27%)

DV: 800 EUR + VAT (27%),

which also has to be paid within 2 days, 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 1200 EUR + VAT (27%)

EV: further 1300 EUR + VAT (27%)

DV: further 1400 EUR + VAT (27%)

VAT-free payment is only acceptable from teams with a valid EU VAT number. In case your team doesn't have an EU VAT number, please transfer the full amount including the 27% VAT.

You are able to request a proforma invoice before payment at hello@fseast.eu.

2.8.9. REGISTRATION AFTER DOCUMENT UPLOAD DEADLINES

If there are open slots on the registration list, teams can apply to participate in the event.

At the moment of the registration the team has to upload all of the requested documents (see documentation rules on the FS East homepage) with exceeded deadlines and pay the registration fee.

Late submission penalty point calculation:

If the documents are accepted after the first submission, no penalty points will be added.

If the first submission fails, but the second is accepted, 50% of the penalty points will be added.

After the third submission 100% of the penalty points will be added.

The documents with not expired deadlines are treated as any other team's documents.

2.8.10. FS EAST REGISTRATION REQUIRED CONTACT INFORMATION

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

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

2.8.11. TEAM MEMBERS

All team members (including the team captain) must adhere to the A4.2 section of the FSG Rules 2022. Professional drivers with an FIA license are not allowed to be registered as drivers.

2.8.12. FACULTY ADVISOR

FS East 2022 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 cannot 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 behavior 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 in Hungaroring.

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.

3. DEADLINES, PENALTIES, AND ADDITIONAL INFORMATION REGARDING DOCUMENTATION

Missing a deadline results in penalties as specified below.

Note, that for the penalties regarding late submission of documentation, 1 day exactly equals 24 hours. For further details see “Official Time”

Teams, which upload obviously unusable information just to pass a deadline can be de-registered from the event in case of recurrence. Affected teams receive a warning in advance.

If the document is rejected, a new resubmission deadline is defined automatically by the system. It is 4 days (96h) or 7 days (168h) after the rejection time depending on the type of the document. (See the table below.)

Late submissions (missing the original deadline or the resubmission deadline after a rejection) will be penalized with 10 (ten) or 5 (five) points for each overdue day depending on the type of the document. (See the table below.)

If the document is not resubmitted 14 days (336h) after the rejection, the team can be deregistered.

- A 3rd rejection of a document will be penalized with an extra 25 (twenty-five) points.
- A 4th rejection of a document will be penalized with an extra 50 (fifty) points.
- A 5th, and any further rejection of a document will be penalized with an extra 75-75 (seventy-five per occasion) points.

Exceptions can be given from these penalty points in case of the team provides meaningful modifications or corrections for each and every reviewer feedbacks.

Failure to submit Engineering Design Report, or Design Spec Sheet, or Autonomous Design Report, or Cost Report Documents - Electronic Copy, or Executive Summary - Electronic Copy documents will automatically result in zero points for the given Event.

3.1. STRUCTURAL EQUIVALENCY SPREADSHEET (SES) AND IMPACT ATTENUATOR DATA (IAD)

SES, IAD and related documents (e.g. SE3D) 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 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 2022 can upload these documents. If your team can not be found on one of these lists please do not hesitate to contact us.

The documents are only accepted in the latest templates, these can be found in the FS East website under Rules and Important Documents 2022 or in the FSG website.

Late submissions are handled differently by FS East, see the penalty points in 3.11 Deadlines.

3.2. [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 at least 98 octane (RON98) gasoline and for teams using E85 we offer MOL Racing Fuel DRX.

3.3. [EV ONLY] ELECTRICAL SYSTEM FORM (ESF)

All EV teams and DV teams with electric traction systems must submit an Electrical System Form through the FSG form. Please register your team on the FSG website.

Teams who are either on the waiting list or on the withdrawn list or on the participating list for FSG 2022 can upload this document. If your team can not be found on one of these lists please do not hesitate to contact us.

ESF Add Item Request is needed for parts not included in the FSG database, it is the team responsibility to check whether their components are included.

Late submissions are handled differently by FS East, see the penalty points in 3.11 Deadlines.

3.4. [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 2022. The ESOs have to be nominated by the team captain on login.fseast.eu. 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.

3.5. [DV ONLY] AUTONOMOUS SYSTEM FORM (ASF)

All DV teams must submit an Autonomous System Form through the FSG form. Please register your team on the FSG website.

Teams who are either on the waiting list or on the withdrawn list or on the participating list for FSG 2022 can upload this document. If your team can not be found on one of these lists please do not hesitate to contact us.

Late submissions are handled differently by FS East, see the penalty points in 3.11 Deadlines.

3.6. [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 2022. The number of ASRs are limited to 5 per team.

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

3.7. ENGINEERING DESIGN DOCUMENTS

3.7.1. 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 FSEAST Rules 2022 version 1.0, beginning of February, 2022). Once the organizers accept the document, the submission is considered to be complete.

3.7.2. 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 FSEAST Rules 2022 version 1.0, beginning of February, 2022). Once the organizers accept the document, the submission is considered to be complete.

3.7.3. [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 FSEAST Rules 2022 version 1.0, beginning of February, 2022). Once the organizers accept the document, the submission is considered to be complete.

3.8. COST REPORT DOCUMENTS

3.8.1. 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 FSEAST Rules 2022 version 1.0, beginning of February, 2022). Once all steps have been completed, the submission of the Cost Report Documents is considered to be complete.

3.8.2. WRITTEN COPY

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

3.9. BUSINESS PLAN DOCUMENTS

3.9.1. 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.

3.9.2. 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.

3.10. TEAM MEMBER DESIGNATION AND HEALTH INSURANCE CERTIFICATE

Participating team members must be designated prior to the event. To designate a team member, please visit the login.fseast.eu website.

In case the health insurance data of one or more team members is missing or 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.

Team members that were declined can be registered again after their health insurance data has been corrected.

3.11. DEADLINES

Formula Student East will apply **March 18th, 2022, 13:00 CET** as a deadline for the following:

Document:	Class:	Required for:	Re-upload deadline	Daily penalty points	Maximum applicable penalty points:
Structural Equivalency Spreadsheet (SES)/ Structural Equivalency 3D model (SE3D)	All	Dynamic events	7	10	No Limit
Impact Attenuator Data (IAD)	All	Dynamic events	7	10	No Limit

Formula Student East will apply **April 1st, 2022, 13:00 CEST** as a deadline for the following:

Document:	Class:	Required for:	Re-upload deadline	Daily penalty points	Maximum applicable penalty points:
Autonomous System Form (ASF)	DV	All Events	7	10	No Limit
Electrical System Form (ESF)	EV, DV, EV	All Events	7	10	No Limit

Formula Student East will apply **May 6th, 2022, 23:59 CEST** as a deadline for the following:

Document:	Class:	Required for:	Re-upload deadline	Daily penalty points	Maximum applicable penalty points:
Hybrid System Description (HSD)	CV-H	Usage of Hybrid system	7	10	No Limit

Formula Student East will apply **June 15th, 2022, 23:59 CEST** as a deadline for the following:

Document:	Class:	Required for:	Re-upload deadline	Daily penalty points	Maximum applicable penalty points:
Team Member Designation and Health Insurance Certificate	All	All Events	-	-	-

Formula Student East will apply **June 22th, 2022, 23:59 CEST** as a deadline for the following:

Document:	Class:	Required for:	Re-upload deadline	Daily penalty points	Maximum applicable penalty points:
Cost Report Documents - Electronic copies	All	Cost and Manufacturing Event	4	5	100 out of 100 (Cost and Manufacturing)
Pitch Video	All	Business Plan Presentation Event	-	-	-

Formula Student East will apply **June 24th, 2022, 23:59 CEST** as a deadline for the following:

Document:	Class:	Required for:	Re-upload deadline	Daily penalty points	Maximum applicable penalty points:
Team Member Designation and Health Insurance Certificate	All	All Events	-	-	-
Engineering Design Report	All	Engineering Design Event	4	5	150 out of 150 (Engineering Design)
Design Spec Sheet	All	Engineering Design Event	4	5	150 out of 150 (Engineering Design)
Autonomous Design Report	DV	Engineering Design Event	4	5	150 out of 150 (Engineering Design-Autonomous part)
Vehicle Status Video (VSV)	All	All Events	7	10	No Limit

Formula Student East will apply **Aug 5th, 2022, 15:59 CEST** as a deadline for the following:

Document:	Class:	Required for:	Re-upload deadline	Daily penalty points	Maximum applicable penalty points:
Business Plan Presentation - Electronic copy (ppt)	All	Business Plan Presentation Event	-	-	75 out of 75 (Business Plan Presentation)

4. TECHNICAL INSPECTION

4.1. GENERAL VEHICLE REQUIREMENTS AND RESTRICTIONS

4.1.1. TIRES

Specific FS East addition to Rules 2022 T2.6.4

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

4.1.2. INSPECTION HOLES

Specific FS East completion to Rules 2022 T3.7.6

The Technical Inspectors may check the compliance of other tubes that have minimum dimensions specified. This may be done by the use of ultrasonic testing or by the drilling of additional inspection holes at the inspector's request. 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 caliper 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 tube dimensions can be measured as well.

4.1.3. FIREWALL PROTECTION

Specific FS East addition to FSG Rules 2022 T4.8.4

At the contact point 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.

4.1.4. GAS CYLINDER/TANK AND THE PRESSURE REGULATOR PROTECTION

Specific FS East addition to FSG Rules 2022 T9.1.1.

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

4.1.5. LOW VOLTAGE SYSTEM (≤ 60 VDC)

Specific FS East completion to Rules FSG 2022 T11.1.2

The maximum permitted voltage that may occur between any two electrical connections in the LVS is 60 V DC or 25 V AC RMS. The only exceptions are 3-phase devices where 48V AC RMS line voltage limit replaces the phase limit.

4.1.6. LOW VOLTAGE SHORT CIRCUIT PROTECTION

Specific FS East completion to Rules FSG 2022 T11.7.7

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.

4.1.7. DRIVER'S UNDERCLOTHING

Specific FS East addition to Rules 2022 T13.3.5

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

4.1.8. VEHICLE IDENTIFICATION

4.1.8.1. TRANSPONDERS

Specific FS East change of Rules 2022 T12.3

Transponders will be provided by FS East. Only provided transponders will be accepted. The allowed mounting position and orientation will be published in the event handbook.

4.1.8.2. TECHNICAL INSPECTION STICKER SPACE

Specific FS East change of Rules 2022 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 125 mm wide must be made available for this sticker.

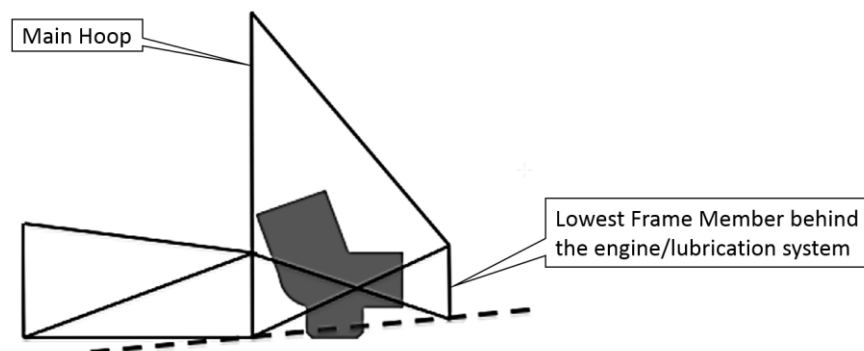
Vehicles that are being entered into multiple competitions in the FSAE series must allow sufficient space along the nose centerline for all inspection stickers.

4.2. SPECIAL REQUIREMENTS AND RESTRICTIONS FOR INTERNAL COMBUSTION ENGINE VEHICLES

4.2.1. ENGINE LUBRICATION SYSTEM

Specific clarification of FSG Rules 2022 T 7.3.1

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



The engine lubrication system must be protected from surface contact in any situation while in operation on track, especially in case of a suspension failure. The skid plate itself cannot be mounted to parts of the engine.

4.3. SPECIAL REQUIREMENTS AND RESTRICTIONS FOR ELECTRIC VEHICLES

4.3.1. DATALOGGER

The datalogger will be provided by FSEast. See Datalogger Specification, which will be updated to the FSEast website.

4.3.2. CURRENT LIMIT VIOLATIONS

Specific FS East addition to FSG Rules 2022 EV2.2

The data logger data will be checked against the maximum accumulator charge and discharge currents stated in the ESF, as well as the values stated in the FSG rules.

4.3.3. GROUNDING CHECKS

Specific FS East addition to FSG Rules 2022 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.

4.3.4. TRACTIVE SYSTEM ENCLOSURES

Specific FS East addition to FSG Rules 2022 EV4.2.1

The warning sticker must be visible from any view. If it is not, multiple stickers must be used.

4.3.5. EV 4.8.2

Specific FS East addition to FSG Rules 2022 EV4.8.2

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

4.3.6. TSAL ATTACHMENT - EV 4.10.5

Specific FS East addition to FSG Rules 2022 EV4.10.5

All parts of the TSAL must be rigidly mounted as well.

4.3.7. DEVICE TO BE USED FOR CHECKING CELL TEMPERATURE

Specific FS East addition to FSG Rules 2022 EV5.8.5.

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

4.4. SPECIAL REQUIREMENTS FOR DRIVERLESS VEHICLES

4.4.1. DV ONLY RULES

Rules A4.4, A6.3.2 A6.7.4 T14 and T15 only apply for cars competing in DV category. DV category does not need first year vehicles.

Rule T3.4.3, T3.7.3, the last sentence of T3.7.4, the second and fourth sentence of T3.9.5 does not obligatory for DV vehicles.

Rule T 4.5.1 and T 4.5.3 are only obligatory if lap belts and anti-submarine belts are attached to the same point.

In T4.2.1 a 300 mm height for the cross section template will be applied instead of 350 mm

.T 4.3.4: Percy's leg for driverless category will be 865 mm.

The accumulator attachment to the major structure may follow T10 - Fasteners of Rules 2020. A usage of self-locking helicoil inserts is not applicable. This also applies to electric motors.

These exceptions cannot be applied to vehicles participating also in CV or EV category.

4.4.2. REMOTE EMERGENCY SYSTEM

The RES that has to be used for the competition is a GF2000i-codec/T53R98 combination from Gross-Funk GmbH.

4.4.3. DATA LOGGER CONNECTIONS & COMMUNICATION WITH RES

For DV category no CAN logging is required. Proper configuration and CAN communication with RES is the team's responsibility. No rerun is guaranteed for RES failure.

4.5. TECHNICAL INSPECTION - GENERAL REQUIREMENTS

4.5.1. INSPECTION & TESTING REQUIREMENT

Specific FS East addition to FSG Rules 2022 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 be replaced by a scrutineer, but rescrutinering may be requested by the scrutineer.

4.5.2. CAR WEIGHTING

Specific FS East addition to FSG Rules 2022 IN 8

If the car weight changes more than 5 kg, the car must be presented for tech inspection and then re-weighed. It is the team's responsibility to have the car re-weighed before entering a dynamic event after changing parts.

4.5.3. BRAKE TEST

Specific FS East addition to FSG Rules 2022 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.

Officials have the right to measure the rotation angles of the axles of the vehicles and judge the successfulness of the test.

4.5.4. BOTS TEST

Specific FS East addition to FSG Rules 2022 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 scrutineering.

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

4.6. TECHNICAL INSPECTION - SPECIAL REQUIREMENTS AND RESTRICTIONS FOR INTERNAL COMBUSTION ENGINE VEHICLES

4.6.1. INSPECTION OF ELECTRONIC THROTTLE CONTROL (ETC)

Internal combustion engine vehicles equipped with ETC will have two parts of technical inspection: mechanical inspection and electrical inspection.

The electrical inspection is the second part of the inspection; it is held in the engine test area and will focus on the operation of ETC.

4.6.2. INSPECTION OF BSPD CIRCUIT

All combustion vehicles must have a BSPD circuit, see FSG Rules 2022 T11.6

A template circuitry can be found on the FSG website:

https://www.formulastudent.de/fileadmin/user_upload/all/2019/important_docs/FSG19_BSPD_v0.3.zip

The inspection of BSPD circuit is held in the engine test area and will focus on its operation.

During BSPD inspection, it must be possible to disconnect both current and brake sensor for fault checks.

The schematic of the power measuring setup must be proved by pictures, if it is not easily accessible.

4.6.3. GEARBOX NEUTRAL POSITION INDICATOR

Specific FS East addition to FSG Rules 2022 CV 1.2.3

Only teams with an autonomous system [DV only] must implement this indicator.

4.7. TECHNICAL INSPECTION - SPECIAL REQUIREMENTS AND RESTRICTIONS FOR ELECTRICAL VEHICLES

4.7.1. INSPECTION OF BSPD CIRCUIT

Specific FS East addition to FSG Rules 2022 T 11.6.9

Team must be able to simulate 5kw in ready to race condition WITHOUT ready to drive mode.

4.8. SCRUTINEERING PROCEDURE

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

	EV	CV	DV
EV1 Scrutineering	X		X(EV Only)
Accumulator Scrutineering	X		X(EV Only)
Mechanical Scrutineering	X	X	X
EV2 Scrutineering	X		X(EV Only)
ETC/BSPD Inspection		X	X(CV Only)
Autonomous System Test			X
Driver Egress & Safety	X	X	X
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

4.8.1. STATIC SCRUTINEERING EVENTS

4.8.1.1. PRE-INSPECTION

There will be no Pre-Inspection on FS East 2021.

4.8.1.2. EV 1 SCRUTINEERING [EV ONLY]

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

4.8.1.3. ACCUMULATOR SCRUTINEERING [EV ONLY]

Electrical Scrutineering 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.

4.8.1.4. MECHANICAL SCRUTINEERING

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

4.8.1.5. EV 2 SCRUTINEERING [EV ONLY]

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

4.8.1.6. AUTONOMOUS SYSTEMS SCRUTINEERING [DV ONLY]

Scrutineering of the Autonomous systems of the car. The car must be in ready-to-race condition, and every scrutineering stage mentioned before has to be passed to start the Autonomous Systems scrutineering.

4.8.1.7. DRIVER EQUIPMENT & DRIVER EGRESS

During the Driver Equipment Test, each team has to present every item listed in Rules 2022 T13 and IN2., and also demonstrate the driver emergency exit situation.

4.8.2. MAINTENANCE DURING SCRUTINEERING

If the team decides to fix any found issue during the inspection, they have a total 15 minutes maintenance time in the scrutineering pit, which is measured cumulatively. After 15 minutes the team has to leave the area.

4.9. SPECIAL REQUIREMENTS FOR A5.6 VEHICLE STATUS VIDEO (VSV)

FSEast will require Vehicle Status Video. If the team fails to meet the requirements presented in FSG Rules 2022, it is the FS East organizers' own subjective decision to let the team compete in the event or not.

4.10. CHANGES BETWEEN TWO CATEGORIES

4.10.1. ADDENDUM TO FS EAST REGISTRATION RULES 2.2

Based on FS East Registration Rules 2.2 the teams are allowed to participate in multiple categories with the same car. This possibility leads to some collisions between the technical rules and the exceptions for driverless vehicles which we want to clarify.

After the passed technical and autonomous scrutineering the teams are allowed to make changes at the autonomous system, EBS, sensors and components (defined in Rules 2020 DV2, DV3 and DV4) between the CV/EV and DV disciplines.

A documentation on the scope of changes must be brought to the technical inspection.

Depending on the scope of the changes other technical inspections (brake test, EBS test, etc.) between the CV/EV and DV disciplines can be required.

4.10.2. ATTENDANCE AT DYNAMIC EVENTS

It is the team's responsibility to enter all dynamic events in time with the same car in both CV/EV and DV categories.

5. 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.

5.1. BUSINESS PLAN PRESENTATION EVENT

On the BPPE event, every car will be handled according to their categories, despite the overall capabilities of the car. That means that in the EV/CV categories the business case should be based on an EV/CV car, in the DV category it should focus on the DV capabilities of the car. EV/CV cars can have DV capabilities, but it should be an extra, not the focus of the business idea.

5.1.1. BUSINESS PLAN DOCUMENTS

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

- Pitch Video
- Business Plan Presentation

5.1.1.1. PITCH VIDEO

Teams have the opportunity to upload their Business Plan Pitch Video (BPPV). The video that is considered the best by the organizers will receive a Special Award.

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..



5.1.1.2. 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 for the initial judging after their electronic copy is submitted.

5.1.2. 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.

5.1.3. JUDGING SEQUENCE

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

- Initial judging of all teams
- 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.

5.1.4. 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.

Non-finalist



$$\text{BPP score} = (P_{\text{your}}/P_{\text{max}}) \times (75-n)$$

Where:

"P_{max}" is the highest score awarded to any team in the given category not participating in the finals

"P_{your}" 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

$$\text{BPP score} = 75-(n-1)$$

Where:

"n" is the place achieved in the Business Plan Presentation Final

It is intended that the scores will range from near zero (0) to seventy-five (75) to provide good separation.

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

5.1.5. 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.

5.2. COST AND MANUFACTURING EVENT

5.2.1. COST REPORT DOCUMENTS

The Cost Report Documents (CRD) consists 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

All CRD documents must be printed by the team and brought as a hard copy to the Event Control. Two hard copies or a splittable folder of the CRD is allowed to be used at the discussion.

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

5.2.1.1. COSTED BILL OF MATERIALS (CBOM)

The chosen system that must be submitted for a CBOM at FS East 2022 will be "Suspension System".

5.2.1.2. COSTED BILL OF MATERIALS (CBOM)

The chosen systems that must be submitted for a DBOM at FS East 2022 will be "Chassis and Body System".

5.2.1.3. 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 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 two (-2) points.

5.2.1.4. 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.

5.2.2. 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.

5.2.3. 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_{max}" is the highest score awarded to any team in the given category not participating in the finals

"P_{your}" 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

5.2.4. 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.

5.3. ENGINEERING DESIGN EVENT

5.3.1. 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.

5.3.1.1. 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 2022 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.

5.3.1.2. [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.

5.3.1.3. 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.

5.3.2. 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.

5.3.3. 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 2022 Article S3.7.2 will be evaluated, but the score-sheet structure and the content of it will differ from FSG Rules 2022, as it will be prepared by the FS East organizers prior to the Event.

6. DYNAMIC EVENTS

As defined in the FSG Rules 2022 Part D.

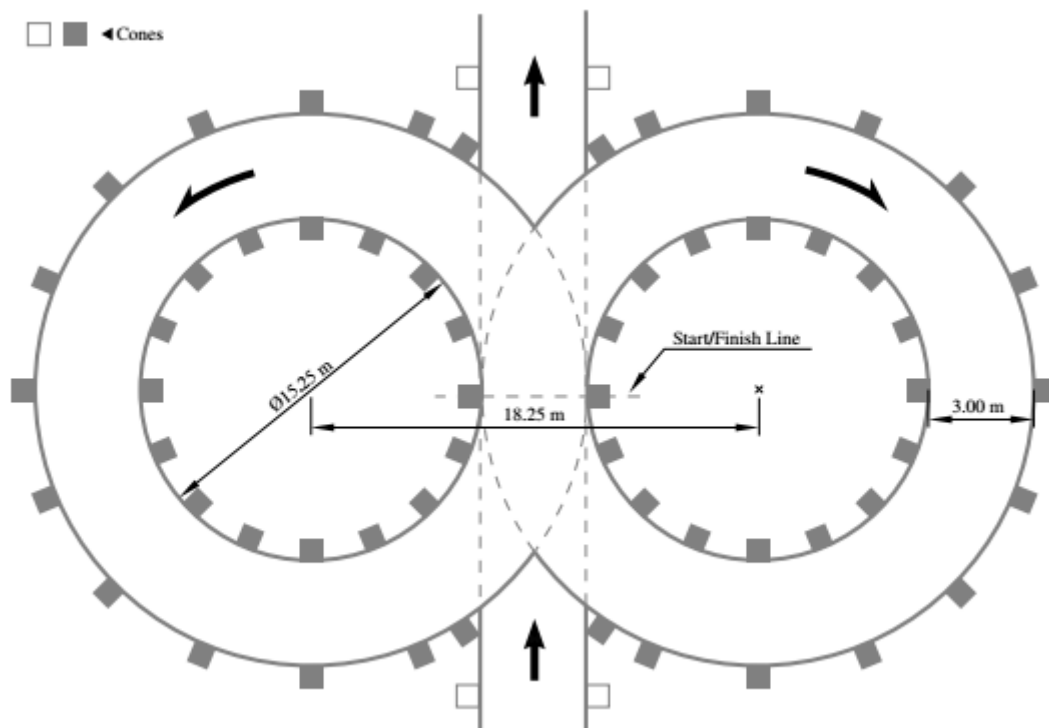
Only those people can enter the Dynamic Area during the Event, who are wearing long trousers (excluding stretch and nylon pants) and closed shoes on their legs, due to safety reasons. Only 4 team members per team are allowed to enter the Dynamic Area, including the driver. Team members must wear wristbands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

6.1. SKIDPAD EVENT

6.1.1. SKIDPAD TRACK LAYOUT

As defined in the FSG Rules 2022 Part D 4.1.

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



Track layout for Skidpad Event

6.1.2. SKIDPAD PROCEDURE

As defined in the FSG Rules 2022.D4.2 for EV and CV vehicles and FSG Rules 2022 D4.3 for DV vehicles.

Specific FS East rules:

Teams will have 4 runs during Skidpad and Acceleration Event.

There will be 2 waiting queues, 1 is for first attempt, second is for 2nd-4th attempt. First Attempts has priority.

6.1.3. SKIDPAD SCORING

For CV and EV vehicles as defined in the FSG Rules 2022 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 2022 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.

6.2. ACCELERATION EVENT

6.2.1. ACCELERATION TRACK LAYOUT

As defined in the FSG Rules 2022.D5.1

6.2.2. ACCELERATION PROCEDURE

As defined in the FSG Rules 2022.D5.2 for EV and CV vehicles and FSG Rules 2022 D5.3 for DV vehicles.

Specific FS East rules:

Teams will have 4 runs during Skidpad and Acceleration Event.

There will be 2 waiting queues, 1 is for first attempt, second is for 2nd-4th attempt. First Attempts has priority.

6.2.3. ACCELERATION SCORING

For CV and EV vehicles as defined in the FSG Rules 2022 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 .

6.3. AUTOCROSS EVENT

As defined in the FSG Rules 2022.D6

6.4. ENDURANCE AND EFFICIENCY EVENT

The minimum point for the efficiency score is 0.

Efficiency is measured during the endurance event.

Only vehicles which meet all of the following requirements are considered for efficiency scoring:

- the vehicle received points for the endurance event
- the uncorrected elapsed endurance time does not exceed 1.333 times the uncorrected elapsed time of the fastest vehicle
- [CV ONLY] the consumed fuel volume does not exceed 15 kg/100 km 98 RON or 21.75 kg/100km E85

[CV ONLY] Fuel pumps must be on and fuel valves must be opened during refueling.

[CV ONLY] The measured fuel mass of vehicles using E85 fuel is divided by 1.45 to be comparable to the vehicles using 98 RON.

[EV ONLY] The endurance energy is calculated as the time integrated value of the measured voltage multiplied by the measured current logged by the data logger, see 4.3.1.

Regenerated energy is multiplied by 0.9 and subtracted from the used energy.

Efficiency points based on the following formula are given:

$$EFFICIENCY_{SCORE} = 75 \left(2 - \frac{EF_{team}}{EF_{min}} \right)$$

with

EF_{team} the team's efficiency factor

EF_{min} the lowest efficiency factor of all teams which were considered for efficiency

The efficiency factor is calculated based on the following formula:

$$EF = T^2 \cdot E$$

with

T uncorrected elapsed driving time

E [CV ONLY] corrected used fuel volume / [EV ONLY] used energy

6.5. 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.

In case of Trackdrive Efficiency, the faster time is relevant and efficiency is measured related to the the faster time. In case of CV - DV vehicles, vehicle must be refueled totally before every Trackdrive attempt.

Every team has 5 minutes to prepare the car, where the marshals 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.

Allowed preparation time for DV teams is 3 to 5 minutes to get into ready- to drive state. Dependent on the length of the waiting que, officials have the right to limit the preparation time up to 3 minutes for DV teams.

6.5.1. 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.

6.5.2. 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.

6.5.3. 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 no "FSG" letters on the cones.

The manufacturer WEMAS6 does not sell the cones to end customers, but they may be purchased from baustellenabsicherung24.de.



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/authorization 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.

6.5.4. 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.

6.5.5. DRIVERLESS AUTOCROSS SCORING

As defined in the FSG Rules 2022.D6.5.

During the DV Autocross Event, if the track is empty, teams are allowed to run their Trackdrive Run as well. Teams who are preparing for the autocross will have priority compared to teams preparing for trackdrive.

6.5.6. DRIVERLESS TRACKDRIVE PROCEDURE

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

During the DV Trackdrive Event, if the track is empty, teams are allowed to run their Autocross Run as well. Teams who are preparing for the trackdrive event will have priority compared to teams preparing for Autocross.

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).

6.5.7. DRIVERLESS TRACKDRIVE SCORING

As defined in the FSG Rules 2022.D8.3

6.5.8. DRIVERLESS EFFICIENCY SCORING

The minimum point for the efficiency score is 0.

Refueling will be done between the 2 trackdrive runs. For scoring the better run's fuel volumes will be taken into consideration.

Efficiency is measured during the trackdrive event.

Only vehicles which meet all of the following requirements are considered for efficiency scoring:

- the vehicle received points for the trackdrive event
- the uncorrected elapsed trackdrive time does not exceed 2 times the uncorrected elapsed time of the fastest vehicle
- [CV ONLY] the consumed fuel volume does not exceed 15 kg/100 km 98 RON or 21.75 kg/100km E85

[CV ONLY] Fuel pumps must be on and fuel valves must be opened during refueling.

[CV ONLY] The measured fuel mass of vehicles using E85 fuel is divided by 1.45 to be comparable to the vehicles using 98 RON.

[EV ONLY] The endurance energy is calculated as the time integrated value of the measured voltage multiplied by the measured current logged by the data logger, see 4.3.1.

Regenerated energy is multiplied by 0.9 and subtracted from the used energy.

Efficiency points based on the following formula are given:

$$EFFICIENCY_{SCORE} = 100 \left(2 - \frac{EF_{team}}{EF_{min}} \right)$$

with

EF_{team} the team's efficiency factor

EF_{min} the lowest efficiency factor of all teams which were considered for efficiency

The efficiency factor is calculated based on the following formula:

$$EF = T^2 \cdot E$$

with

T uncorrected elapsed driving time

E [CV ONLY] corrected used fuel volume / [EV ONLY] used energy

6.6. SPECIAL ADDITION TO THE FSG RULES 2022

6.6.1. 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.

6.6.2. 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 Organizers 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!

6.6.3. 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.

The Length of the Autocross and Endurance Track Layout will be around 600 meter.

6.6.4. FUEL

FS East offers two types of fuels for teams.

1. Gasoline RON 98
2. MOL Racing Fuel DRX for teams using E85 (Details can be found at www.fseast.eu)

Teams should come to the FS East 2022 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.

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.

6.6.5. TIMEKEEPING

Transponders will be provided by FS East Event.

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 parallel to the ground and perpendicularly to the centerline of the vehicle. The transceiving surface must not be obscured by any parts of the vehicle. Image of a possible solution will be shown in the Event Handbook.

6.6.6. 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.

6.6.7. 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 organizers. Drivers must stop the vehicle at the side of the track in a safe place.

7. CHANGELOG

March 2022. - Version 1.0

2nd release

Version 1.0

Version	Date	Modification	Page
0.9	December 2021	Initial release	-
1.0	March 2022	Document upload deadlines	-



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