

FORMULA STUDENT GERMANY

INTERNATIONAL DESIGN COMPETITION

9 - 14 August, 2016
Hockenheim



EVENT HANDBOOK 2016

Version 1.1

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1 EMERGENCY INFORMATION

Minor Injury:

Medical Centre:

Please accompany the injured person to the medical centre. Emergency aid is provided there. The medical centre is occupied every day round the clock.

Severe Injury:

Contact someone with a two-way radio:

Every official and security has a two-way radio. Ask them to call the medical centre or an ambulance on radio channel 11.

Call an ambulance yourself:

Call an ambulance yourself if someone is severely injured and requires urgent help. The emergency number for every landline and mobile phone is **112**. (Also see information about emergency calls below.)

During Dynamics: During the dynamic events (Friday, Saturday, Sunday), an ambulance is on site. To contact it, ask someone with a two-way radio (official, security).

Hospital: Main Hospital: Kreiskrankenhaus (Schwetzingen), Bodelschwinghstrasse 10, 68723 Schwetzingen
phone: +49 (0) 6202 / 84-30 (Also see directions in Chapter 1.3)

Emergency Numbers:

If an emergency occurs outside the times of the competition, call 112. This number works with all land lines, as well as mobile phones or coin-operated telephones as international GSM-standard. It is always free of charge.

112

Officials:

| | |
|--------------------------------|-------------------------|
| Pit Marshal Konrad Paule | Tel. +49 151 560 747 00 |
| Pit Marshal Sebastian Seewaldt | Tel. +49 151 560 747 01 |
| Event Control Daniel Ahrens | Tel. +49 151 560 747 02 |
| Back Office Sven Grundner | Tel. +49 151 560 747 03 |

(In case of an emergency, please call one of them, no matter what time it is.)

Emergency Call Translations:

The emergency control centre will ask you some questions to ensure proper help. To support you with the call, here are some standard questions and some suggestions for answers in English and German.

Who is calling? (*Wer ruft an?*)

Say your name and your telephone number for callbacks.

Digits in German: 0 (null), 1 (eins), 2 (zwei), 3 (drei), 4 (vier), 5 (fünf), 6 (sechs), 7 (sieben), 8 (acht), 9 (neun)

Where did it happen? (*Wo ist es passiert/geschehen?*)

| | |
|----------------------|--|
| Address event site: | Hockenheimring, Sachshaus, Am Motodrom |
| | Make it more precise: pit lane (Boxengasse), dynamic area (Fahrerlager); |
| Address campsite C2: | Hockenheimring, Zeltplatz C2 beim Motodrom Hotel |
| Address campsite C3: | Hockenheimring, Zeltplatz C3 an der Continental Straße |

What happened? (*Was ist passiert? / Was ist geschehen?*)

Accident (Unfall), traffic accident (Verkehrsunfall), fire (Feuer), fall (Sturz), explosion (Explosion)

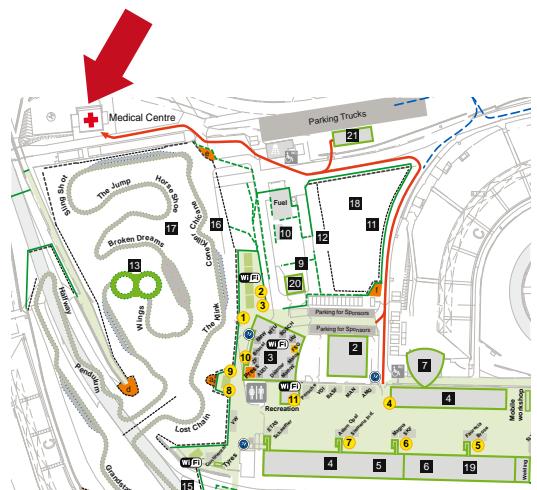
How many people are injured? (*Wie viele Personen sind verletzt?*)

1 (eins), 2 (zwei), 3 (drei), 4 (vier), 5 (fünf), 6 (sechs), 7 (sieben), 8 (acht), 9 (neun), 10 (zehn)

What injury do they have? (*Welche Verletzung haben sie?*)

Fracture (Knochenbruch), bleeding (Blutung), unconsciousness (Bewusstlosigkeit), burn (Verbrennung), electric shock (Stromschlag), suffocation (Ersticken), heart attack (Herzinfarkt), shock (Schock)

Don't hang up after answering these questions! Wait to hear if the control centre has further questions!



1.1 BEHAVIOUR IN CASE OF REGULAR FIRES (FUEL, OIL, PAPER, ETC.)

- 1) Call for help (fire fighters / ambulance) by either finding an official with a radio or calling 112
- 2) Assist injured persons to leave the area, provide first aid
- 3) Try to extinguish the fire, if this is possible without risking your own safety
- 4) Leave the area and instruct others to do so as well
- 5) Wait for the fire fighters/ambulance to arrive
- 6) Handling of the situation by the fire fighters, medical treatment provided by ambulance

1.2 BEHAVIOUR IN CASE OF ACCUMULATOR/ FSE CAR FIRES

- 1) Activate alarm horn (will be positioned at neuralgic spots such as the charging area, FSE pits or marquee above pits during Statics)
- 2) Immediately leave the area and instruct others to do so as well. Assist injured persons to leave the area, provide first aid.
- 3) Stay out of fumes coming from the accumulator, mind the wind direction
- 4) Call for help (fire fighters / ambulance) by either finding an official with a radio or calling 112
- 5) Wait for the fire fighters/ambulance to arrive
- 6) Handling of the situation by the fire fighters, medical treatment provided by ambulance

1.3 DRIVING DIRECTIONS TO THE HOSPITAL IN SCHWETZINGEN

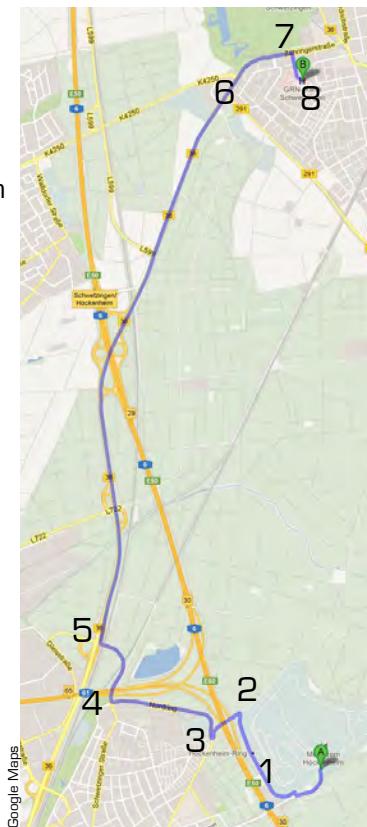
- 1) You start at the Hockenheimring and head northwest
- 2) Turn left onto Ernst-Wilh.-Sachs-Straße => 350 m
- 3) Turn right onto Nordring => 1km
- 4) At the roundabout, take the 1st exit onto Schwetzinger Straße => 650 m
- 5) Turn right to merge onto B36 toward Mannheim/Schwetzingen => 5km
- 6) Slight left onto Hockenheimer Landstr./B36, Continue to follow B36=> 750m
- 7) Turn right onto Bodelschwinghstraße => 210m
- 8) Turn left, Hospital will be on the right

Hospital/Kreiskrankenhaus Schwetzingen
Bodelschwinghstraße 10
68723 Schwetzingen

The distance is 8 km; total travel time will be about 10 minutes.



<https://maps.google.com/local?q=49.37807,8.57035>



1.4 WHAT SHOULD I DO IN CASE OF ELECTRIC SHOCK?

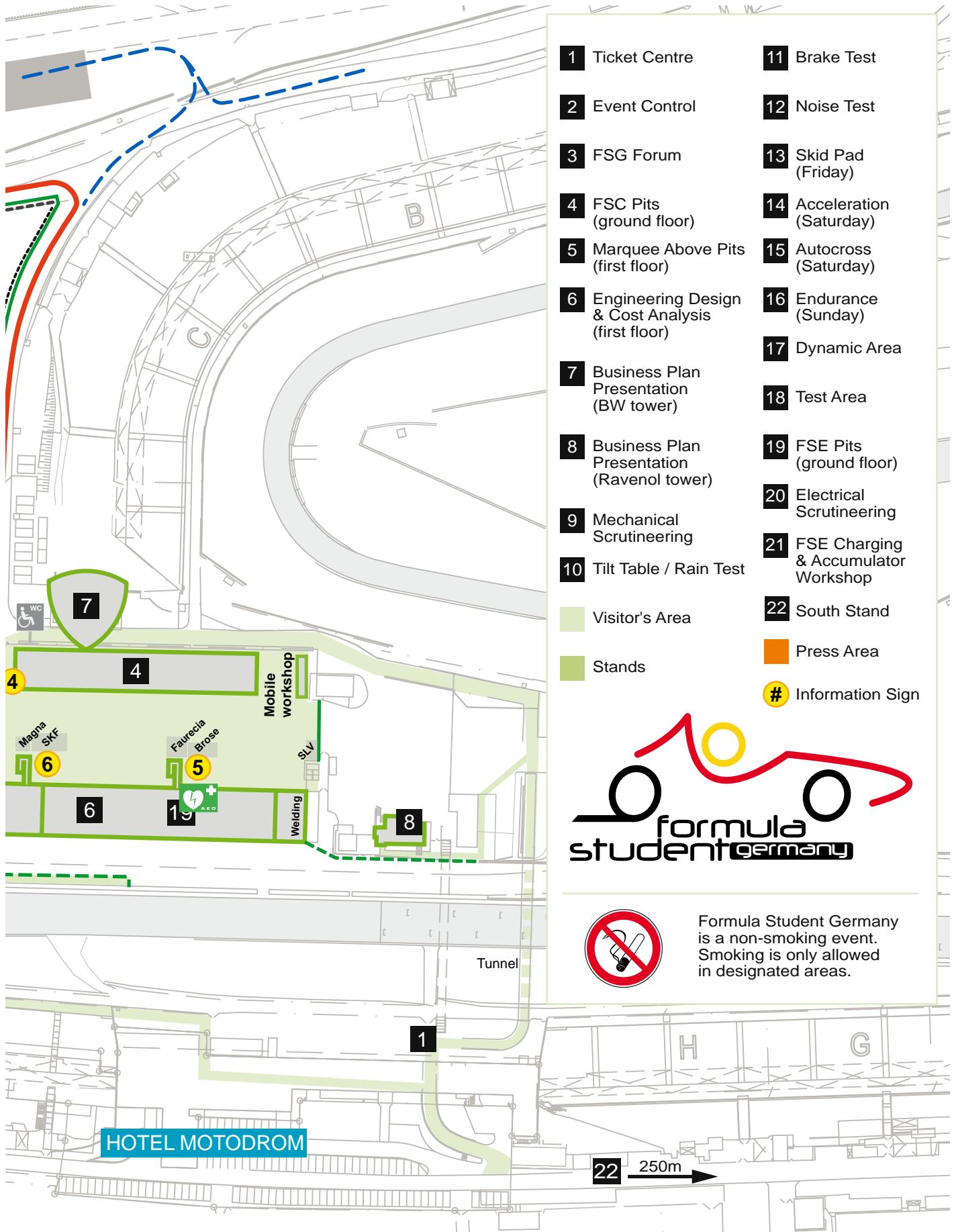
- » Call for medical help.
- » Push one of the emergency shut down buttons and wait until the TSAL is switched off.
- » Try to speak with the victim and ask him/her about his/her health.
- » Insulate yourself if you must move a victim away from a live contact - wear dry gloves or cover your hands with cloth and cover potential contact paths with the car with the HV insulation blanket. Watch your footing to make sure that you do not slip or fall when trying to move the victim.
- » Do not move the victim if there is a possibility of neck or spinal injuries (for example from a path) unless it is absolutely necessary.
- » Give artificial respiration if the victim is not breathing.
- » Give CPR (Herz-Lungen-Wiederbelebung) if the injured person's heart has stopped (only if you are trained in CPR) or use an Automated External Defibrillator (AED).
- » Cover burns with a sterile dressing. On the surface, electrical burns may not look serious, but the burn can be severe deeper in the tissue.
- » Keep the victim comfortable, warm and at rest and monitor breathing.



2 EVENT DETAILS

2.1 SITE PLAN





2.2 SCHEDULE

TUESDAY, 9 AUGUST, 2016

14:00 Scrutineering Order, Registration- & Entrance Order Available
 15:30 17:30 FSC & FSE Team Registration
 16:00 22:00 Entrance for Team Vehicles
 17:00 24:00 FSC & FSE Pits & Recreation Area available
 18:00 20:00 Accumulator Scrutineering
 18:00 20:00 Event Control, Driver & Safety Responsible Registration
 18:00 22:00 Charging Tent
 21:00 22:00 Team Welcome
 22:00 22:30 Scrutineering Briefing

1 Ticket Center
 1 Ticket Center
 Venue
 4 19 Venue
 21 Charging Tent
 2 Event Control
 21 Charging Tent
 5 Marquee above pits
 5 Marquee above pits

WEDNESDAY, 10 AUGUST, 2016

06:00 22:00 Charging Tent
 06:00 24:00 FSC & FSE Pits & Recreation Area available
 07:30 19:00 Ticket Center & Event Control
 08:00 18:00 FSG Academy On Site
 09:00 13:00 Scrutineering / Tech Inspection / Tilt, Brake, Noise, Rain / Fuel
 09:00 18:30 FS Driverless Concept Award Judging
 13:00 14:00 Lunch Break & Staging for Panoramic Photograph
 14:00 19:00 Engine Test
 14:00 19:00 Scrutineering / Tech Inspection / Tilt, Brake, Noise, Rain / Fuel

21 Charging Tent
 4 19 Venue
 1 2 Ticket Center
 22 South Stand
 9 10 11 12 Dynamic Area
 7 BW Tower
 9 10 11 12 Racetrack
 18 Engine Test Area
 9 10 11 12 Dynamic Area

THURSDAY, 11 AUGUST, 2016

06:00 22:00 Charging Tent
 06:00 24:00 FSC & FSE Pits & Recreation Area available
 07:30 19:00 Ticket Center & Event Control
 08:00 08:30 Team Briefing
 08:00 18:00 FSG Academy On Site
 08:30 19:00 Scrutineering / Tech Inspection / Tilt, Brake, Noise, Rain / Fuel
 09:00 19:00 Engine Test / Testing
 12:00 13:00 Scrutineering Lunch Break
 13:15 18:00 FSE Engineering Design & FSE Cost Analysis
 13:15 18:00 Special Awards
 13:30 18:00 FSE Business Plan Presentation
 14:00 18:30 Team Photos
 19:00 20:00 FSE Business Plan Presentation Finals

21 Charging Tent
 4 19 Venue
 1 2 Ticket Center
 5 Marquee above pits
 22 South Stand
 9 10 11 12 Dynamic Area
 9 10 11 12 Dynamic Area
 9 10 11 12 Dynamic Area
 5 Marquee above pits
 3 FSG Forum
 7 8 BW Tower; Ravenol Tower
 5 Marquee above pits
 5 Marquee above pits

FRIDAY, 12 AUGUST, 2016

06:00 22:00 Charging Tent
 06:00 24:00 FSC & FSE Pits & Recreation Area available
 07:00 19:00 Ticket Center & Event Control
 07:30 08:00 Team Briefing
 08:00 18:00 FSG Academy On Site
 08:30 17:15 FSC Engineering Design, FSC Cost Analysis
 08:30 19:00 Scrutineering / Tech Inspection / Tilt, Brake, Noise, Rain / Fuel
 09:00 17:45 Team Photos
 09:00 18:00 Special Awards
 09:00 18:30 Engine Test / Testing
 09:00 18:30 FSC Business Plan Presentation
 11:00 13:30 Worldwide Formula Student Officials Meeting
 11:00 18:30 Skid Pad
 12:00 13:00 Scrutineering Lunch Break
 19:00 20:30 FSE Engineering Design Finals
 20:00 21:00 FSC Business Plan Presentation Finals
 21:00 22:00 Awards Ceremony - Part I

21 Charging Tent
 4 19 Venue
 1 2 Ticket Centre
 5 Marquee above pits
 22 South Stand
 5 Marquee above pits
 9 10 11 12 Dynamic Area
 3 Marquee above pits
 3 FSG Forum
 18 Dynamic Area
 7 8 BW Tower; Ravenol Tower
 Motodrom Hotel
 13 Dynamic Area
 9 Dynamic Area
 3 FSG Forum, not public
 5 Marquee above pits
 5 Marquee above pits

SATURDAY, 13 AUGUST, 2016

06:00 22:00 Charging Tent
 06:00 24:00 FSC & FSE Pits & Recreation Area available
 07:00 19:00 Ticket Center & Event Control
 07:30 08:00 Team Briefing
 08:00 09:00 Design Review
 08:00 18:00 FSG Academy On Site
 08:30 12:30 FSC & FSE Acceleration
 08:30 18:30 Fuel / Engine Test / Testing
 08:30 18:30 on request: Scrutineering / Tilt, Brake, Noise, Rain
 09:00 11:00 Design Feedback - Judges meet Team Members
 11:00 11:45 Press Guided Tour
 12:00 12:45 Press Conference
 13:00 14:00 VIP Reception

21 Charging Tent
 4 19 Venue
 1 2 Ticket Centre
 5 Marquee above pits
 5 Marquee above pits
 22 South Stand
 14 Start/Finish Line
 18 Dynamic Area
 9 10 11 12 Dynamic Area
 5 Marquee above pits
 7 Assembly at entrance BW Tower
 7 BW Tower, 4.floor
 7 BW Tower, 4.floor

2.3.3 OFFICIALS (SELECTION)



Daniel Ahrens
Event Control



Ragnheiður Bjork Hallorsdóttir
Business Plan Presentation



Tim Hannig
Award Ceremonies



Sebastian Hoppe
Cost Event



Peter Jakowski
Security, Campground



Rainer Kötke
Dynamics



Norina Kurth
Registration & Tickets



Peter Leipold
Design Event



Rob Opdam
E & M Inspection



Konrad Paule
Academy & Pit Marshal



Frank Röske
Rules



Torsten Rilka
Statics & Scoring



Sebastian Seewaldt
Rules & Pit Marshal



Ulf Steinfurth
Mechanical Inspection

At venue, we will answer your questions directly. To contact us during and after the event, please write us via e-mail (you can find the e-mail addresses on our website): <https://www.formulastudent.de/officials/>

2.4 ORGANISATIONAL ASPECTS

2.4.1 REGISTRATION

Tuesday, 9 August

| | |
|---------------|--|
| 14:00 | Scrutineering order, registration order & entrance order available (Ticket Centre) |
| 15:30 – 17:30 | Team registration (Ticket Centre) |
| 16:00 – 22:00 | Entrance for Team Vehicles |
| 17:00 – 24:00 | Pits available |
| 18:00 – 20:00 | Driver & safety responsible registration (Event Control) |

All team captains received a registration document with standard terms and personal information of all registered members. This document must be printed out, signed by ALL team members and brought to registration. Only the team captain is to sign this paper at registration and confirm with his/her signature the correctness and validity of all other signatures. With his signature, the team captain also guarantees that only team members worked on the car and that the safety guidelines were followed.

Truck Parking:

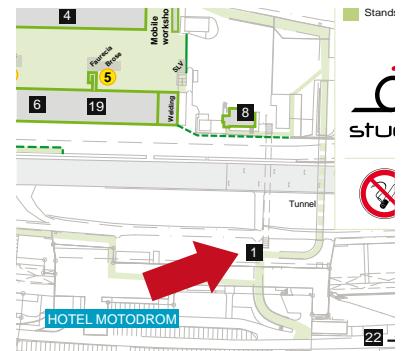
The truck driver of each team has to wait at the truck parking for his/her team captain to hand over the green vehicle entrance pass with the entrance number. He can drive to the gateway as soon as he has filled out the green pass including the pink "carbon copy" and his team is called to enter via the FSG twitter channel.

- » Do not block emergency exits!
- » Follow the instructions of the marshals!
- » Do not move your truck to the FSG gateway entrance until order from the marshals is received to do so.



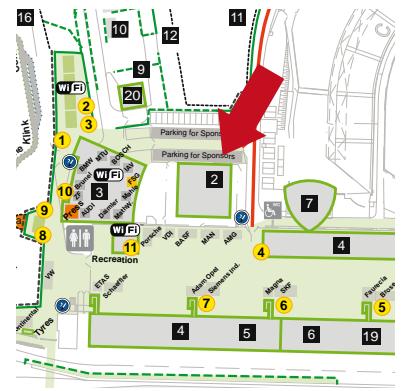
Ticket Centre:

ONLY event team captains may register their team. They can be accompanied by only ONE other team member! The ticket centre consists of 3 containers: one for "guests & press" and two for "teams & visitors". Please check the registration/scrutineering order before getting in line. One of the "teams & visitors" containers deals with the odd and the other one with the even numbers of the registration/scrutineering order. Please try to get the right order in the queues. The event team captain has to sign the document with all signatures and will then receive all passes for his registered team members, an event guideline poster and a green vehicle entrance pass. The team is then ready to enter FSG in the given order.



Event Control:

At the event control, the event team captain will receive a package containing shirts, programmes, etc. Large teams may bring 1 or 2 extra people to help carrying.



Driver Registration:

Each team has to register at least 4 drivers. The drivers register themselves at the event control where they have to show their valid driver's license as well as a student ID. They will then receive wristbands marking them as drivers.

2.4.2 PARKING / VEHICLE ENTRANCE PASS

You are allowed to enter the venue with a vehicle only if you have a vehicle entrance pass and when it's your turn. The scrutineering order is used as entrance order for the pit. Please follow the FSG twitter channel to check if you are already clear to enter. Until you are called via twitter, please wait at the truck parking. At the registration you receive a green vehicle entrance pass for 1 vehicle. A pink "carbon copy" is attached to the green pass. You will have to fill out the vehicle entrance pass including the pink "carbon copy" and display it behind the windscreen. When your team is called via twitter you can leave the truck parking and approach the gateway. Please line up in the queue on the right site at the barrier. When entering for the first time, the green pass is kept by the officials. You then have 30 minutes to unload your truck in front of your pit. Afterwards you have to leave the pits. You then are allowed to park this vehicle at the parking area which can be found at the "Querspange", on the other side of the fence behind the charging tent.

Please note, that it is not possible to drive to the pits again during the event. This means your team will have to transport all its equipment between the pits and your truck by foot. At the "Querspange" the trucks will be accessible at all times. For loading on Sunday you can enter the pits with the pink pass again from 12:00 onwards.

On request, you can receive an additional yellow entrance pass that allows you to enter the pits with one vehicle for the next hour for unloading or loading. No yellow passes will be given out after Sunday, 11:00. Don't stay on site with a yellow permit longer than necessary!

The parking area has to be left by Monday, after the event, until 10:00.

Walking speed is the speed limit on the entire event site. You cannot access the Hockenheimring between 24:00 and 06:00.

2.4.3 ANNOUNCEMENTS

The event will proceed according to the official time schedule as far as possible. Listen to the announcements and look out for the placards at the event control for changes in the schedule. During the event all announcements can be found on the following webpages:

<https://www.formulastudent.de/fsc/2016/announcements-on-site/>
<https://www.formulastudent.de/fse/2016/announcements-on-site/>

2.4.4 PIT AND EVENT SITE

The pits and infield opens at 6:00 on all days except Tuesday and closes at 24:00 on all days except Sunday for visitors AND all participants:

| | |
|----------------------|--|
| Tuesday | 17:00 - 24:00 |
| Wednesday - Saturday | 06:00 - 24:00 |
| Sunday (pits) | 06:00 - 20:00 |
| Sunday (event site) | 06:00 - 01:00, right after the MAHLE party |

Pavilions are not allowed on the entire event site.

2.4.5 PIT EQUIPMENT

In every pit group there is power supply and light. In the night the pits are guarded from 18:00 to 08:00. You can see which team is in which pit in the team list.

2.4.6 SURVEILLANCE

After 18:00, there will be a security company for surveillance of site, pits and cars. During the day, the teams are responsible for the security of their car and the equipment in their pit. Do not leave any valuables open in your pit at any time. Security is unable to monitor everything all the time.

2.4.7 TRANSPONDERS / TIME-KEEPING

Two RFID-Tags will be mounted on your car directly before the Brake Test and tested during Brake Test. The size of each tag is 104mm x 33mm and will be mounted with an adhesive double-sided tape to your bodywork. The tags will be positioned on the left side of your vehicle:

- » one tag in the area of the car's nose
- » one tag in the area of the sidepod / side impact structure.

These tags must not be removed until the competition ends, since they are vital for the timekeeping system. If a tag comes loose or falls off, please contact a member of the timekeeping team via event control. The tags do not have to be returned to the FSG organizers after the event.

It is planned to provide live-timing via internet at <http://tk.formulastudent.de>.

Please note: The shown data is unofficial. No protests can be handed in based on the live-timing.

2.5 RULES AND GUIDELINES

Everyone (participants, volunteers, & spectators) at Formula Student Germany would like to enjoy an accident free event. The following guidelines have been established to advise teams of potential unsafe practices in the paddock and pit area.

2.5.1 ALCOHOL

PLEASE NOTE: Alcohol on the event site is strictly forbidden!

Along with the fun, we want a safe competition. There will be alcohol testing (breathalyzers) during the event. 0 % is the allowable alcohol content during this event for everyone.

If ANY team member (driver or not), is tested with an alcohol level higher than 0.0 %, he or she will be immediately disqualified for the rest of the event. The second person of the same team caught with an alcohol level higher than 0.0 % will result in the entire team being disqualified immediately.

The prohibition ends at the beginning of the party on Sunday evening.

2.5.2 WORKING ON THE CAR (FSC & FSE)

- » Working time from 06:00 up to 24:00.
- » In case of using angle grinders, we advise you to wear proper safety equipment!!
- » During the use of all electrical machines like drills or angle grinders, please wear ear protection!
- » When using metal cutting equipment that produces metal chips, eye protection is required for the operator as well as any team member assisting. If you are operating loud tools, hearing protection is required.
- » Any operation producing litter or debris, e.g. cutting of carbon fibers, should not be performed in the pits.

2.5.3 WORKING ON THE CAR (FSE)

Additional requirements apply for FSE. Activities on the tractive system must take place in the FSE pit. A safety responsible (SR) and at least one more team member, who can interfere in case of emergency, must attend every activity on the tractive system. Only members of your team and Scrutineers are allowed to stay behind the barrier tape.

After any activity on the tractive system during which seals were broken an E-Scrutineering is mandatory! For activities on the inactive tractive system please keep to the following procedure:

- 1) Separate the car with a black-yellow barrier tape, provided by FSG, or use your own barrier tape.
- 2) Switch off the voltage of the tractive system.
- 3) Assure the tractive system against restart.
- 4) Check for zero-potential.
- 5) Open HV disconnect.
- 6) Install a sign, provided by FSG, that declares the car as electrically secured. Note the name of the safety responsible (SR) supervising the activities on the sign. This safety responsible (SR) is the only person who may remove the sign and the barrier.

In case of measurements on the active tractive system or an activation of the tractive system in the pit for testing purposes please keep to the following procedure:

- 1) Separate the car with a black-yellow barrier tape, provided by FSG, or use your own barrier tape.
- 2) The car must be jacked up and the driven wheels demounted.
- 3) One team member must be prepared to push an emergency button at any time.
- 4) Team members who take part in the measurement activities must wear compliant safety gloves and use appropriate measurement devices and tools.
- 5) The tractive system must only be activated for as long as necessary.
- 6) Activities on the internal issues of the accumulator containers are exclusively permitted at the declared spots near the charging area and require the attendance of a safety responsible (SR). All team members who take part in the activities must wear compliant safety gloves and use appropriate measurement devices and tools. At least one team member must not directly be involved in the work conducted on the accumulator, but must be there to assist in case of an incident.

Work on the tractive system may also take place at the accumulator workplaces, as the accumulator is part of the tractive system.

If any of the above mentioned instructions is not obeyed, it may result in deduction of points or disqualification.

2.5.4 JACKING

When jacking your car up off the ground a safe, stable, load rated support device must be used. The use of crates, piles of wood, or four strong team members, is NOT ALLOWED.

2.5.5 RUNNING ENGINES (FSC)

You are allowed to run engines ONLY in the designated engine test area. This may only be done during the opening times, after passing scrutineering! Engines may not be run in the pit garage! Even in the engine test area, there are several guidelines to follow in terms of safety. Please read these guidelines in chapter "3.1.5 Engine Test Area (FSC)" attentively.

2.5.6 SETTING THE TRACTIVE SYSTEM ACTIVE (FSE)

- » Any time the tractive system is activated a safety responsible (SR) must be involved.
- » The activation of the tractive system in the dynamic area requires the explicit approval of an FSG official.
- » The activation of the tractive system or the spinning of motors in the pit is only permitted if the car is jacked up
- » and the driven wheels are demounted. Please also see the guidelines in section "2.5.3 Working on the Car (FSE)".

2.5.7 FIRES AND SMOKING

No open fires are allowed in the pit area and in the engine test area. This includes BBQ grilles, oxy-acetylene torches, heaters, cigarettes, etc. Smoking is strictly prohibited in the dynamic area, in all buildings, and in the pit area. Smoking is permitted only in the area around the grandstands and in between event control and the BW Tower.

2.5.8 WELDING

FSG provides an approved welder. Welding is allowed in the designated welding area only. Welding will be provided at the following times:

| | | |
|-----|-----------|---------------|
| Wed | 10 August | 14:00 – 18:00 |
| Thu | 11 August | 09:00 – 18:00 |
| Fri | 12 August | 09:00 – 18:00 |
| Sat | 13 August | 09:00 – 18:00 |
| Sun | 14 August | 09:00 – 18:00 |

Outside of this times it is possible to weld with own equipment in the welding area using appropriate safety gear.

2.5.9 TYRES

FSG provides a tyre changing service. The opening hours of the Continental truck:

| | | |
|-----|-----------|---------------|
| Thu | 11 August | 08:00 – 19:00 |
| Fri | 12 August | 08:00 – 19:00 |
| Sat | 13 August | 08:00 – 19:00 |
| Sun | 14 August | 08:00 – 19:00 |

2.5.10 FUEL AND OIL

Open fuel containers are not permitted at the event. All fuel containers must be DOT approved. Waste oil is to be taken to the fuel station for disposal. Refuelling is only allowed at the fuel station.

2.5.11 FIRE EXTINGUISHERS

Your fire extinguishers are to be immediately accessible at all times. All team members must be familiar with their use. At least one fire extinguisher must accompany the car wherever it goes.

2.5.12 VEHICLE MODIFICATIONS

If you make any major modifications to your car beside FSAE Rule T1.2.2, cars must return to scrutineering for re-approval.

2.5.13 FLAGGING

All drivers must know the competition-flagging signals.

2.5.14 BEHAVIOUR

Alcohol and drugs have no place at this event. Alcohol is only allowed on the camp site and on Sunday at the Mahle-Party. Roller blades, scooters, bicycles and self propelled vehicles are not allowed on site.

2.5.15 TESTING

Driving practice is only allowed within the designated test areas and at the designated times.

2.5.16 HOW TO WHEEL THE CAR (FSC)

Whenever a car is moved, there must be:

- » A driver wearing a full safety suit seated in the cockpit.
- » A fire extinguisher accompanying the car at all times.
- » Someone pushing the car with a pushbar at a normal walking pace.
- » Cars with wings are required to have two team members walking on either side of the vehicle whenever the vehicle is being pushed. The walking team member is allowed to push e.g. a tool trolley.

2.5.17 HOW TO WHEEL THE CAR (FSE)

Whenever a car is moved, there must be:

- » A driver wearing a full safety suit seated in the cockpit.
- » A fire extinguisher accompanying the car at all times.
- » Someone pushing the car with a pushbar at a normal walking pace.
- » Cars with wings are required to have two team members walking on either side of the vehicle whenever the vehicle is being pushed. The walking team member is allowed to push e.g. a tool trolley.
- » The detachable handle or key of the tractive system master switch must be taken-off completely and kept by a safety responsible (SR).
- » In case that the car has not passed E-Scrutineering, the HVD must be disconnected, while the car is moved around on the event site. This also includes taking part in static events.

2.5.18 SPECIAL NOTE FOR DRIVERS

All drivers should do a check of critical fasteners and components on their vehicles to assure complete control during the driving events. Fasteners come loose, parts break due to fatigue, and occasionally someone forgets to torque a nut – this may have serious consequences for your safety!

**REMEMBER: USE THE KILL SWITCH in case of an engine or brake malfunction!
HAVE FUN – DRIVE SAFELY – USE COMMON SENSE!**

3 DYNAMIC EVENTS

3.1 GENERAL INFORMATION

The dynamics at FSG are compliant with the FSAE rules Part D and additional FSG Rules. The following pages describe the additional procedures and key aspects. Other information will be provided at the morning briefings on site.

3.1.1 TEAM / DRIVER-BRIEFINGS

There are team briefings every morning of the competition at the Marquee (on Thursday at 8:00, on Friday, Saturday and Sunday at 07:30). All team captains and drivers for that day must attend. The briefing contains general event information and detailed information about the dynamic events of the day.

On Tuesday at 22:00 there is a special scrutineering briefing. All team captains and Inspection Responsible Persons must attend. The briefing contains information regarding Scrutineering and Technical Inspection.

The RFID-wristband will be scanned at the entrance of the Marquee to log the driver as attendant on the present day. Without this scan, participation at the dynamic events of the day is not possible. Missing the briefing means missing the dynamic events.

3.1.2 ACCESS TO THE DYNAMIC AREA

Every team will receive four vests. With these vests, four team members including the driver and/or the Safety Responsible (FSE only) may enter the dynamic area. Please note that the vests are not fireproof. Drivers must take them off when sitting in the car, but must put them back on afterwards. When a driver is in the car another team member already wearing a vest should keep the vest of the driver (do not fix it on the car).

3.1.3 WEATHER

This is one of the factors which can not be influenced by the event organisation. So please be aware that the timetable will not be changed due to bad weather conditions.

Under normal conditions, the track is declared dry. If it is necessary to declare damp or wet conditions, there will be signs and announcements at the dynamic area. Please read the rules for more information.

An exception is the skid pad event - like the last years. The track will be sprayed with water and hence declared wet all day.

3.1.4 CAR SET-UP ALTERATIONS (FSAE RULE T1.2.2)

Teams do not have to use the same car set-up for all the dynamic events and are encouraged to make adjustments (e.g. tyre pressure and suspension settings) to give the vehicle characteristics best suited to each specific event. However, the car must comply with the rules (e.g. wing positions etc.).

Teams that remove their car from the event site after the event begun will be disqualified from the FSG event.

3.1.5 ENGINE TEST AREA (FSC)

| | | | |
|-----------|-----|-----------|---------------|
| Schedule: | Wed | 10 August | 14:00 – 19:00 |
| | Thu | 11 August | 09:00 – 19:00 |
| | Fri | 12 August | 09:00 – 18:30 |
| | Sat | 13 August | 08:30 – 18:30 |
| | Sun | 14 August | 08:30 – 18:30 |

Location: Wed - Fri: North of the pit lane (left arrow)
Sat - Sun: Dynamic Area (right arrow)

There is a designated area, which is the only area you are allowed to test run engines in. A driver and up to two additional team members are allowed in the test area during engine testing. Your car must have passed scrutineering and you must follow the guidelines below:



!! ENGINES MAY NOT BE RUN IN THE PIT GARAGE !!

Whenever an engine is running:

- » The car must be in the designated engine test area.
- » The car must be adequately supported with the wheels off the ground at least of 10.2 cm (4").
- » A driver, wearing a full safety suit, must be seated in the cockpit. The driver is to be belted in.
- » There must be a fire extinguisher immediately available in case of fire.
- » The gearbox must be in neutral or the drive wheels must be dis-engaged (CVT).
- » No one is allowed under the car while the engine is running.
- » Re-fueling is only allowed in the designated fuel area.
- » Engines are not allowed to be running while the car is pushed through the paddock.
- » Engines are only allowed to be run during the designated engine testing hours.

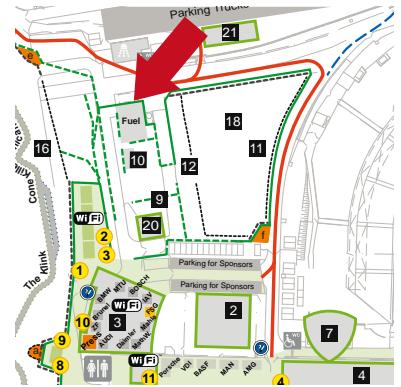
Teams should exercise caution with regard to activation of electrical / ignition systems within these areas.

3.1.6 FUEL STATION (FSC)

| | | | |
|------------------|-----|-----------|---------------|
| Schedule: | Wed | 10 August | 09:00 – 19:00 |
| | Thu | 11 August | 08:30 – 19:00 |
| | Fri | 12 August | 08:30 – 19:00 |
| | Sat | 13 August | 08:30 – 18:30 |
| | Sun | 14 August | 08:30 – 18:30 |

Location: Dynamic area

The fuel station will provide standard Shell fuel to each car as requested by the team (95, 98 Octane and E85). No other fuel or additives are permitted.



Be aware that no participant is allowed to bring fuel to the competition. FSG will provide all fuel for the competition at the fuelling station.

NOTE: no vehicle will be provided with fuel until it has passed scrutineering.

On Sunday teams which finished the endurance will have priority for refueling

Follow specific safety guidelines while in the fuelling area: All engines must be turned off; cars are to be pushed to and from fuelling.

- » Only the driver, wearing a driving suit, is permitted in the area as fuel is dispensed.
- » No mobile phones are allowed in the fuelling area!!
- » A marked line or similar identifying mark must be used to indicate the "full" level.
- » The tank is to be filled to the max. level line each time the car is refueled.
- » Shaking of the car during fueling process is not allowed.
- » Re-fueling must be possible without the removal of any body parts of the car.

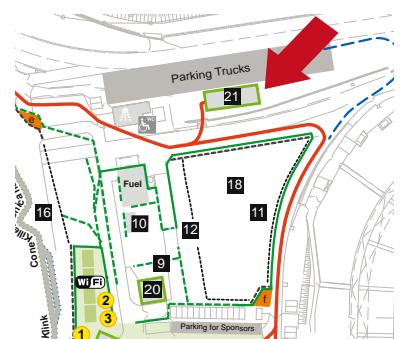
The first time the vehicle receives fuel, the car must proceed (with the engine off) to the tilt table.

3.1.7 CHARGING AREA (FSE)

| | | | |
|------------------|-----|-----------|---------------|
| Schedule: | Tue | 9 August | 18:00 - 22:00 |
| | Wed | 10 August | 06:00 - 22:00 |
| | Thu | 11 August | 06:00 - 22:00 |
| | Fri | 12 August | 06:00 - 22:00 |
| | Sat | 13 August | 06:00 - 22:00 |
| | Sun | 14 August | 06:00 - 19:00 |

Location: Charging Area

The charging of tractive system accumulators is exclusively allowed in the charging area.



No more than four team members of an individual FSE team are allowed to be in the charging area at the same time. Only charging devices marked during E-Scrutineering may be used. A team member has to always stay with the accumulators during charging. The accumulator containers must have a label with the following data:

- » Team name
- » Safety responsible (SR)
- » Approximate time at which the charging period ends (date and time).

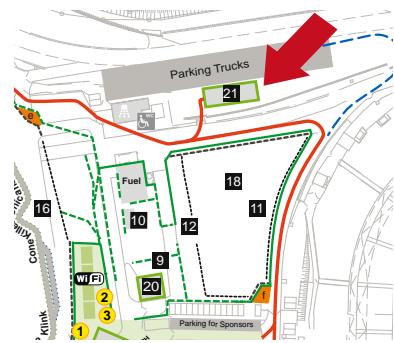
The team member supervising the accumulators while charging should have necessary knowledge to act accordingly if any problems occur.

3.1.8 ACCUMULATOR WORKPLACES (FSE)

| | | | |
|-----------|-----|------------|---------------|
| Schedule: | Tue | 9. August | 18:00 - 22:00 |
| | Wed | 10. August | 06:00 - 22:00 |
| | Thu | 11. August | 06:00 - 22:00 |
| | Fri | 12. August | 06:00 - 22:00 |
| | Sat | 13. August | 06:00 - 22:00 |
| | Sun | 14. August | 06:00 - 19:00 |

Location: Charging Area

Activities on accumulators are permitted exclusively at the accumulator workplaces. Only FSE team members and FSG officials have access to it. A security guard is present at all times. Please also refer to the guidelines in chapter "2.5.3 Working on the Car (FSE)". No more than four team members of an individual FSE team are allowed to be in the charging area at the same time. Work on the accumulators must always be supervised by a safety responsible.



3.2 TECHNICAL & SAFETY INSPECTION

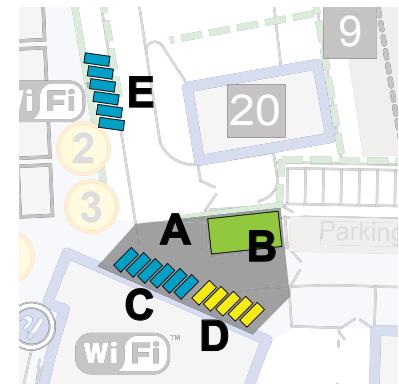
Each car must pass all parts of technical inspection and testing, and bear the inspection stickers, before it is permitted to participate in any dynamic event or to run on the practice track.

FSC cars get the following four stickers: M-scrutineering, tilt table test, noise test & brake test.

FSE cars get the following five stickers: E-scrutineering, M-scrutineering, tilt table test, rain test & brake test.

3.2.1 SCRUTINEERING WAITING AREA & PRE-SCRUTINEERING (FSC & FSE)

The **waiting area for scrutineering (A)** is placed at the dynamic's main gate, so every team member can push their car into the waiting area without a dynamic pass. There are six parking spots for **M-scrutineering (C)** & five parking spots for **E-scrutineering (D)**. For **re-scrutineering** there are separate parking spots (**E**) inside the dynamic area. Repairing the car at these parking spots is prohibited, this should be done in the pit. To keep the event site as accessible as possible, it is NOT permitted to park your car anywhere else in front of the waiting area.



To facilitate a smooth and fast scrutineering for the teams and the scrutineers it is important to follow the **scrutineering order**. The scrutineering order is determined by the scrutineering quiz (see FSG rule 2.14) and can be found on the website or signs near the ticket centre or the gate before Scruti parking zone.

Do not move your car from the pit until you receive an e-mail where the **Technical Inspection Status (TIS)** of your car is set to "**M/E Waiting Queue**". Your TIS can also be checked via the website and is visible on the screens in the recreation tent. When you get this message you should leave the pit and report yourself with the car to the coordinating scrutineer in the waiting area (A). He will ask you to park your car in one of the waiting spots for M-Scrutineering (C) or E-scrutineering (D). Then you will proceed to the obligatory **pre-scrutineering (B)** as described below.

Inspection Responsible Person

To accelerate the technical inspection process (for E and M scrutineering) and accumulator check, the team has to appoint one team member (for the E-teams this has to be one of the registered ESOs), who will be responsible for the technical inspection. This team member should be familiar with the car and all the inspection points of the technical inspection sheet. He has to be able to show the scrutineers the compliance of the car with respect to all the inspection points. This team member will also assure that the car is ready for inspection. This includes that all documents, test samples and tools needed for scrutineering are available at the inspection. During inspection may this team member has to perform the technical inspection autonomously, observed by the scrutineers. He should be able to answer all their questions regarding the scrutineering. If this team member is not able to perform any of these requirements or the car is not ready, the technical inspection will be stopped and the team will have to go back to the box. A re-try for scrutineering can be done via re-scrutineering.

To pre-scrutineering in the waiting area you **MUST** bring the following items:

- » All helmets you plan to use at the event
- » All driver gear and other safety gear
- » All the tyres (on rims) you plan to use at the event
- » 2 fire extinguishers (which are unused and not overdue)

FSE teams need to bring following items in addition to above mentioned:

- » Basic set of HV-proof tools
- » Multimeter
- » Safety equipment as defined in the Technical Inspection Sheet.

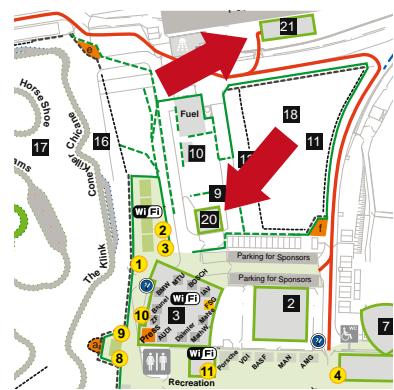
Before entering for E-/M-scrutineering, all listed items will be checked and marked and will NOT be checked again at scrutineering and therefore should not be brought to scrutineering inside the dynamic area.

Scrutineering is NOT possible without the pre-scrutineering in the waiting area.

3.2.2 ELECTRICAL SCRUTINEERING (FSE)

| | | | |
|-----------|-----|-----------|--|
| Schedule: | Tue | 9 August | 18:00 – 20:00 (only Accumulator Check) |
| | Tue | 9 August | 22:00 – 22:30 Scrutineering Briefing |
| | Wed | 10 August | 09:00 – 13:00, 14:00 – 19:00 |
| | Thu | 11 August | 08:30 – 12:00, 13:00 – 19:00 |
| | Fri | 12 August | 08:30 – 12:00, 13:00 – 19:00 |
| | Sat | 13 August | on request |

Location: Scruti-House & Charging Tent



3.2.2.1 ACCUMULATOR CHECK

All FSE teams have to pass the so called Accumulator Check to proceed to regular E-scrutineering. Therefore the accumulator container has to be removed and opened. Showing only pictures of the container interns isn't sufficient anymore. Nevertheless pictures can still be provided in addition.

The container and its inner parts will be checked for rule compliance and sealed afterwards. Also the accumulator charger will be checked and don't need to be brought to the E-Scrutineering at the Scruti-House afterwards.

The Accumulator Check will start on Tuesday evening for the Top5 FSE teams from Scrutineering order in the Charging Tent. From Wednesday on the Accumulator Check will be continued in the Charging Tent for all FSE teams.

Please note:

Cell modules or stacks don't need to be dissembled. But teams need to make sure that AIRs, fuses, pre- & discharge circuit and positive locking mechanism of the maintenance plugs will be reachable and visible for the scrutineers.

During Accumulator Check the temperature measuring device DS1922T-F5 (iButton) will be assembled into the accumulator according to the position defined and agreed in the ESF.

Directly after endurance and leaving Park Fermé, every team has to come back to the Charging Tent for disassembling the iButton from the accumulator container.

Passing the ESF does not imply full rules compliance. The final decision will be made by the scrutineer on the event!

3.2.2.2 E-SCRUTINEERING

The car may only be moved around on the event site with all master switches and shutdown buttons in off-position and the HVD open. Therefore, the CS-master switch, the TS-master switch, the right, the left and the cockpit shutdown button have to be turned off! Furthermore, the detachable handle or key of the tractive system master switch has to be removed and kept safe by a safety responsible.

Scrutineers will mark or seal various different approved parts (i.e. insulation monitoring device, accumulator containers, energy meter, tires, rims etc.). The car can be disqualified from any dynamic event by using unmarked parts or substituting marked parts. Parts with broken seals are equivalent to being unmarked.

Broken seals can only be replaced by a scrutineer.

Passing the ESF does not imply full rules compliance. The final decision will be made by the scrutineer on the event!

Please be well prepared as there is only 2 hours of E-scrutineering time per team.

To Scrutineering you must bring:

- » The Technical Inspection sheet - it must always stay with the car.
- » All accumulator containers to be used during the event
- » Data sheets for all used parts in the tractive system
- » Accumulator Container Hand Cart, if needed
- » Tools needed for (dis-)assembly of parts for E-Scrutineering
- » Print-out of rule questions (if needed)
- » NOTE: Four team members maximum in the inspection box

3.2.2.3 INSULATION MONITORING DEVICE TEST (IMDT)

The insulation monitoring device will be tested during E-scrutineering. This is done by connecting a resistor between several parts of the tractive system and electrically conductive vehicle parts while the tractive system is active. The size of the resistor is defined as 250 Ohm/V related to the maximum tractive system operation voltage. The test is passed if the insulation monitoring device shuts down the tractive system whenever the resistor connects the tractive system to grounded parts.

The IMDT may be repeated at any time during the event. After the car passes the test for the first time, critical parts of the tractive system will be sealed. The vehicle is not allowed to take part in any dynamic event if any of the seals are broken until the IMDT is successfully passed again.

3.2.3 MECHANICAL SCRUTINEERING

| | | |
|------------------|---------------|--------------------------------------|
| Schedule: | Tue 09 August | 22:00 – 22:30 Scrutineering Briefing |
| | Wed 10 August | 09:00 – 13:00, 14:00 – 19:00 |
| | Thu 11 August | 08:30 – 12:00, 13:00 – 19:00 |
| | Fri 12 August | 08:30 – 12:00, 13:00 – 19:00 |
| | Sat 13 August | on request |

Location: Dynamic Area – surrounding tents at Scruti-House

The Mechanical Scrutineering will start on Tuesday evening for the Top5 FSE teams from Scrutineering order in the Scrutineering Area.

Before taking part in any of the dynamic events, you must take your car to M-scrutineering.

To get all the teams through M-scrutineering as fast as possible, there will be up to eight teams of scrutineers. The M-scrutineering takes place at the Scruti House, which is within the dynamics area.

Please note:

- » **The Technical Inspection sheet must always stay with the car** (not only for the scrutineering, but at all times so that an official can always check the status of the car).
- » **No work for repairing or improving** is allowed at M-scrutineering
- » **Four team members maximum (incl. the tallest registered driver)** in the inspection box.
- » **Only one tool hand cart** is allowed in the inspection box; the **overall size is limited** to 1000 mm x 500 mm x 1100 mm (length x width x height).

To M-scrutineering you must bring:

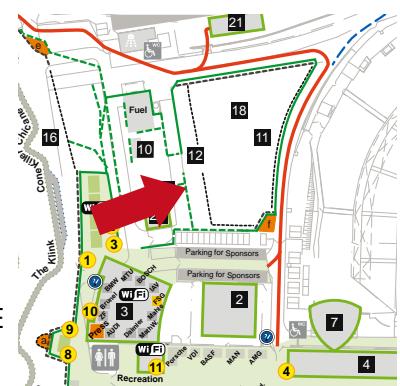
- » The car (in fully assembled, drive-ready condition)
- » Copies of any Safety Structure Equivalency Forms
- » Copies of any Impact Attenuator Data Requirement
- » A test piece from the impact attenuator
- » Teams with MONOCOQUE: Must see laminate test specimen
- » The tallest driver of the team
- » Quick jack and push bar
- » ONLY tools needed for (dis-)assembly of parts for M-scrutineering

Please be well prepared as there is only 1 hour of M-scrutineering time per team.

- » If you do not finish M-scrutineering within the given timeframe you have to leave the dynamic area, fix all complaints and rejoin the queue at the end.
- » Enter M-scrutineering with the tallest driver in the car in ready-to-race condition and prepared for roll bar height and egress check.
- » Your other drivers might be checked as well upon request of the scrutineer.
- » If the scrutineers feel that the car is NOT in „finished condition“ (per Rule S2.6) the inspection process will be stopped and the team has to leave the dynamic area.

After successful M-scrutineering you will get the technical inspection sticker and you can proceed to the tilt table after having fuelled up the car. If you have items that need to be rectified, the form will be returned to you (the team), you will not get your sticker, and you will have to present your car for M-scrutineering again.

Scrutineering reserves the right to spot check any car at any time during the event.



3.2.4 TILT TABLE TESTING

| | | |
|------------------|---------------|------------------------------|
| Schedule: | Wed 10 August | 09:00 – 13:00, 14:00 – 19:00 |
| | Thu 11 August | 08:30 – 12:00, 13:00 – 19:00 |
| | Fri 12 August | 08:30 – 12:00, 13:00 – 19:00 |

Location: Dynamic Area

Tilt testing checks if the vehicle complies with the liquid spillage and rollover stability rules. No vehicle is permitted at this station until it has passed mechanical Scrutineering. The stickers that must be applied to the car will serve as proof of this.



At this point we want to remind the teams to bring the car in 'ready to race' condition. That means that all the liquids of the car should be filled properly, all components of the car are mounted.

The vehicle will be placed upon the table with the tallest driver aboard. The vehicle should be oriented on the tilt table in the direction that is most likely to create spillage. The table will then be tilted to an angle of 45 degrees. There must be no fluid leakage at this angle. If the vehicle passes this test, the angle is increased to 60 degrees. This angle is used to represent a cornering force of 1.7 Gs. If the upper wheels remain on the table the vehicle passes. (Some vehicles may lift one wheel. The station manager(s) should be consulted if this occurs). The person in charge at the tilt table must sign an inspection form, which travels with the car. A sticker is applied (on the car), to indicate it passed the tilt table test.

FSE vehicles are now free to proceed to the rain test. Should the vehicle (FSC and FSE) fail at either of the two angles, the car must be repaired and re-tested.

Vehicles may be asked to return to this station for re-certification at the discretion of the officials.

Safety guidelines for the tilt area:

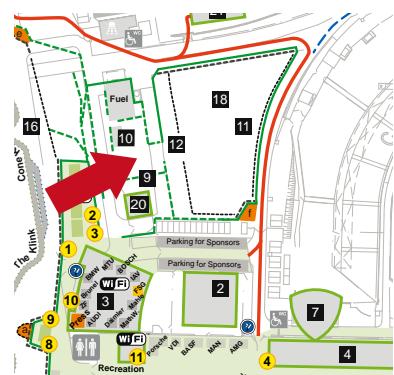
- » Four team members maximum (incl. the tallest registered driver) in the tilt table area
- » All engines and master switches off, push car on and off table. Care must be taken to avoid damage to the vehicle when pushed on and off the tilt table.
- » Inside wheels are to be placed against the guard of the tilt table.
- » Attach a strap to rollover hoop and side of table which is to be elevated. Allow a little slack. (Team members may be asked to hold the car, if a strap is not available).
- » Be sure table is clear before raising and especially when lowering. Inform people in area when raising or lowering (e.g. "Coming Down").
- » Use absorbent material to soak up leaks (may be obtained at fuel station). Keep a fire extinguisher at hand.

3.2.5 RAIN TESTING (FSE)

| | | |
|------------------|---------------|------------------------------|
| Schedule: | Wed 10 August | 09:00 – 13:00, 14:00 – 19:00 |
| | Thu 11 August | 08:30 – 12:00, 13:00 – 19:00 |
| | Fri 12 August | 08:30 – 12:00, 13:00 – 19:00 |

Location: Dynamic Area

Teams have to pass a special rain test during scrutineering. The car has to pass E-scrutineering, Scrutineering, and Tilt Table before the rain test can be conducted.



During the rain test, the tractive system has to be active and none of the driven wheels may be in contact with the ground. It is not allowed to have a driver seated in the car during the rain test.

For this test the car has to be in the same condition as presented at electrical inspection.

3.2.6 NOISE TESTING (FSC)

| | | |
|------------------|---------------|------------------------------|
| Schedule: | Wed 10 August | 09:00 – 13:00, 14:00 – 19:00 |
| | Thu 11 August | 08:30 – 12:00, 13:00 – 19:00 |
| | Fri 12 August | 08:30 – 12:00, 13:00 – 19:00 |

Location: Dynamic Area

The vehicle will be checked for compliance with the sound level restrictions. No vehicle is permitted at this station until it has passed scrutineering and the tilt table test. Proof of this are the two stickers which must be applied to the car.

Teams must bring a laptop for reaching a constant engine speed more precisely and to show the engine rpm monitored from the ecu on the laptop. The sound level may not exceed 100 dB(C) at idle speed and not exceed 110dB(C) during running the calculated engine rpm.

If the vehicle passes the test, the person in charge is to sign the approval form and provide the team with the third sticker. The vehicle is now free to proceed to the brake test.

If the vehicle is unable to pass in three attempts, the car must be repaired and then brought back for retest. The vehicle will not be allowed to compete without passing this test.

The noise level can be measured at any time during the dynamic events. Penalties may be given if the sound level exceeds the mandated maximum. Vehicles may be forced to return to this station for re-certification should the officials deem it necessary. Re-certification may be required if work is performed on the vehicle's exhaust system or if the vehicle is involved in an incident which results in vehicle damage.

3.2.7 BRAKE TESTING (FSC & FSE)

| | | |
|------------------|---------------|------------------------------|
| Schedule: | Wed 10 August | 09:00 – 13:00, 14:00 – 19:00 |
| | Thu 11 August | 08:30 – 12:00, 13:00 – 19:00 |
| | Fri 12 August | 08:30 – 12:00, 13:00 – 19:00 |

Location: Dynamic area, behind the Scruti-House

Brake Testing checks that the vehicle can be brought to a controlled stop. No vehicle is permitted at this station until it has passed tech inspection, the tilt table test, and the noise test. Proofs of this are the three stickers which must be applied to the car.

Each driver must be instructed as to the proper procedure for the brake test.

With the car at the start line of the station a green flag (or similar signal) should be used to signal the start of each run. The driver must accelerate (typically getting into 2nd gear) until reaching the braking area, which is a box defined by pylons. Once inside this box, the driver must apply the brakes with enough force to demonstrate full lock-up of all four wheels. A second marshal should wave a red flag as the driver enters the box.

If the vehicle passes the test, the person in charge is to sign the approval form and provide the team with the last tech sticker. The vehicle is now free to proceed to the practice track or on to the dynamic events.

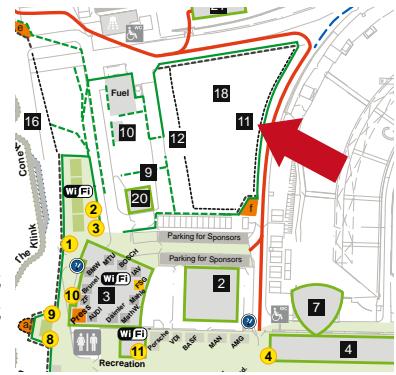
If the vehicle is unable to pass either of the two tests in three attempts, the car must be repaired and then brought back for retesting. The vehicle will not be allowed to compete without passing this test.

Re-certification may be required if work is performed on the vehicle's brake system or if the vehicle is involved in an incident which results in vehicle damage.

3.2.8 ENERGY METER INSTALLATION

The energy meter will be installed prior to or during E-scrutineering. The energy meter responsibles will be situated at E-scrutineering and hand out the energy meter and needed connectors. They will also help with installation, if needed, and answer upcoming questions.

The proper function of the energy meter will be evaluated by the energy meter responsibles after the team has passed E-scrutineering.



The energy meter responsible will read out data from time to time via a wireless connection to determine, if the 80kW limit was obeyed during the dynamic events.

The energy meter data used to calculate the efficiency scoring will be read out in the parc ferme.

After the data was read out the energy meter has to be removed from the car and returned to the energy meter responsible.

We encourage all teams to record own efficiency data for the unlikely event of an energy meter failure during the endurance event. Any attempt to manipulate the intended function of the energy meter may lead to a disqualification from the entire event. If you have any questions with respect to the energy meter, please ask for the energy meter responsible at event control.

3.3 TESTING

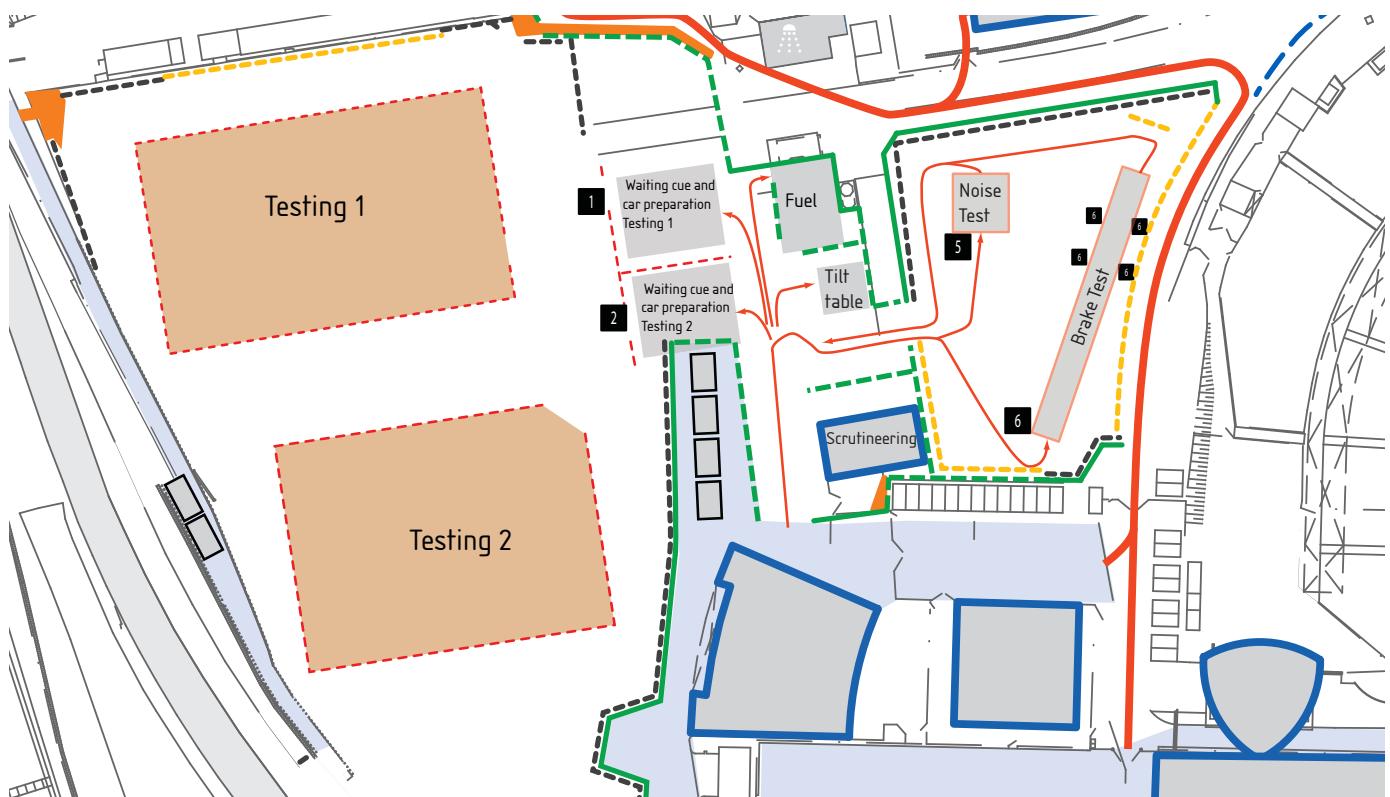
| | | | |
|------------------|-----|-----------|---------------|
| Schedule: | Thu | 11 August | 09:00 – 19:00 |
| | Fri | 12 August | 09:00 – 18:30 |
| | Sat | 13 August | 08:30 – 18:30 |
| | Sun | 14 August | 08:30 – 18:30 |

| | | | |
|------------------|-----|-----------|--------------------|
| Location: | Thu | 11 August | Big dynamic area |
| | Fri | 12 August | Big dynamic area |
| | Sat | 13 August | Small dynamic area |
| | Sun | 14 August | Small dynamic area |

On Wednesday, Thursday, and Friday, the big dynamic area is available for testing (up to two tracks on Wednesday and Thursday, one track on Friday).

The ground is made of asphalt. Teams may use the test areas to set up and test their cars. The testing time per team depends on the waiting queue and will be 3 to 5 minutes per run. For additional testing, teams have to get back in line.

On Saturday and Sunday, the small dynamics area is available for testing. Unfortunately, the ground of this area differs a lot from the one at the big dynamics area. It is made of concrete, partially painted and shows small bumps. Hence, it provides less grip. Please keep the ground condition in mind when setting up your car for the events.



Dynamics Area on Thursday – Testing / Technical checks

3.4 DYNAMIC DISCIPLINES

3.4.1 SKID PAD

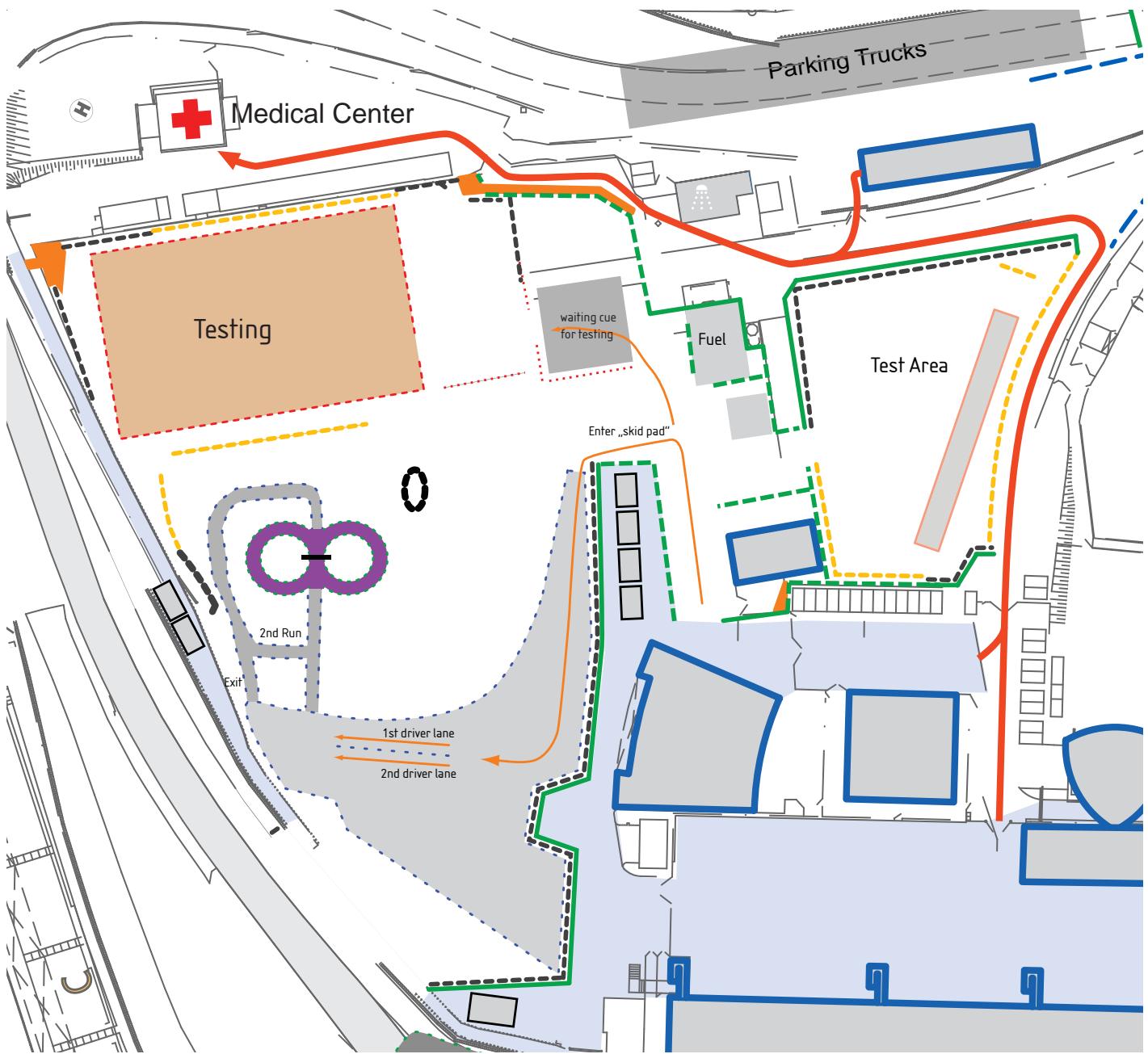
Schedule: Fri 12 August 11:00 – 18:30

Location: Dynamic area

There will be a two lane queue for this event. Lane one is for the first driver of the team, lane two for the second driver. The queue closes 15-30 minutes before the end of the event, depending on the number of cars waiting.

Each driver can choose to drive one or two runs in a row. The second run may be performed immediately after the first run without re-entering the queue.

Skid Pad will be carried out on a very very wet track as a suspension challenge to judge how teams cope in such conditions.



Dynamics Area on Friday morning – Skid Pad / Testing

3.4.2 ACCELERATION

Schedule: Sat 13 August 08:30 – 12:30

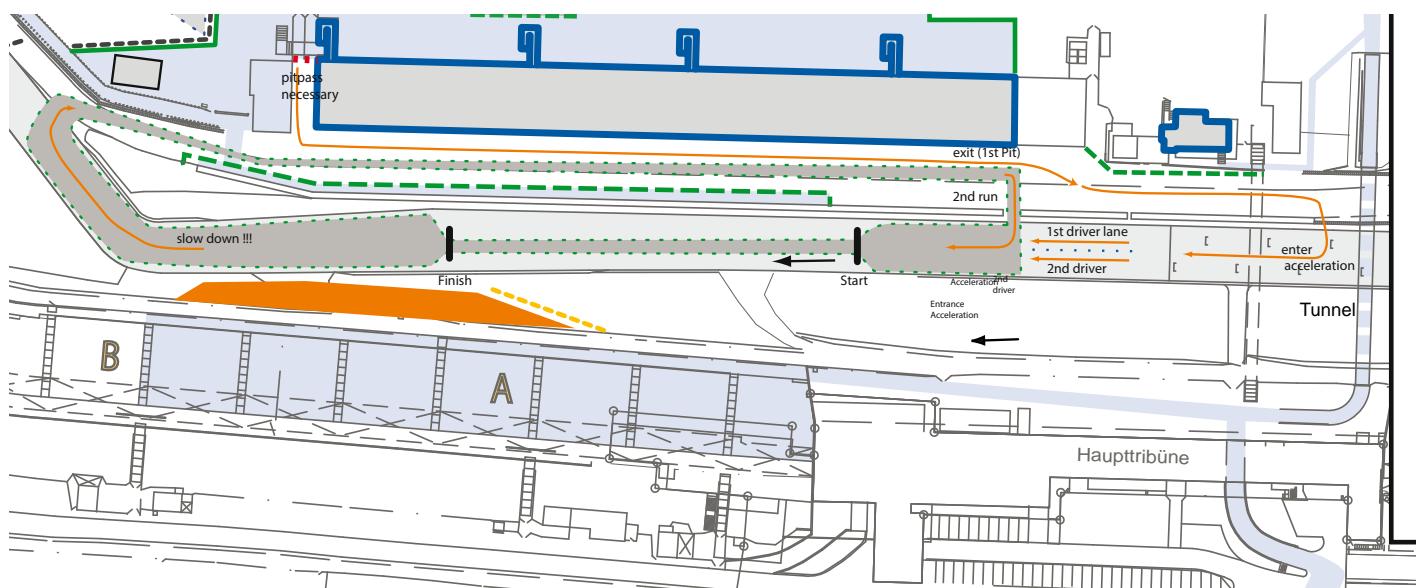
Location: Start/Finish Line of the Hockenheimring

Similar to the Skid Pad event, the waiting queue for the Acceleration event is a two lane queue. Lane one is for the first driver of the team, lane two for the second driver. The queue closes 15-30 minutes before the end of the event, depending on the number of cars waiting.

Each driver can choose to drive one or two runs in a row. The second run may be performed immediately after the first run without stepping back to the end of the queue.



This year's acceleration event is located at the start/finish line of the F1 circuit. Waiting queue and warm up area is situated on the track. After passing the finish line of the Acceleration, there is a big slow down area (Nordkurve) before you have to turn into the "F1 pit lane" to return to the start for the second run. In case of passing the spectator area while driving through the pit lane, a slow car speed is recommended and enforced by the officials.



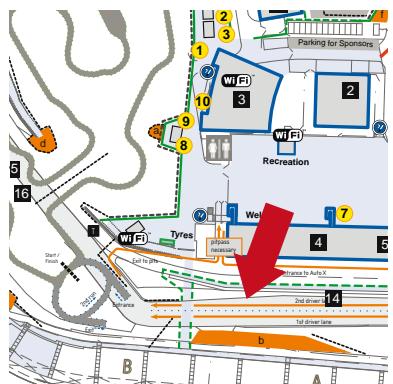
Dynamics Area on Saturday morning – Acceleration

3.4.3 AUTOCROSS

Schedule: Sat 13 August 13:30 – 13:50 Coursewalk
Sat 13 August 14:00 – 20:00 Autocross

Location: Dynamic area; starting queue on start-finish line

Autocross is installed at the paddock of the Hockenheim GP racetrack. Therefore, the track is lined with cones. Green cones are used for the track boundary, orange cones are used for slalom and blue cones are used for entrance and exit of the course. The track direction is clockwise. Each run comprises one lap with a flying start. Two cars are on the track at the same time with an offset of half a lap. Each driver can choose to drive one or two runs in a row. The second run may be performed immediately after the first run without re-entering the queue. If the runs are performed separately, the driver must exit the course after the first run and drive through the driver change area slowly back to the start for the second run. The queue closes 15-30 minutes before the end of the event, depending on the number of cars waiting. Closing time will be announced by a sign.



Due to the fact that multiple cars are on the track simultaneously, a stalled car can influence the lap time of the other car. In this case, the run for the stalled car is lost. For the other cars, a rerun of the lap is allowed.

3.4.4 ENDURANCE

Schedule: Sun 14 August 08:00 – 08:20
Sun 14 August 08:30 – 13:00
Sun 14 August 13:00 – 18:00

08:00 – 08:20
08:30 – 13:00
13:00 – 18:00

Coursewalk
Endurance FSG
Endurance FSG

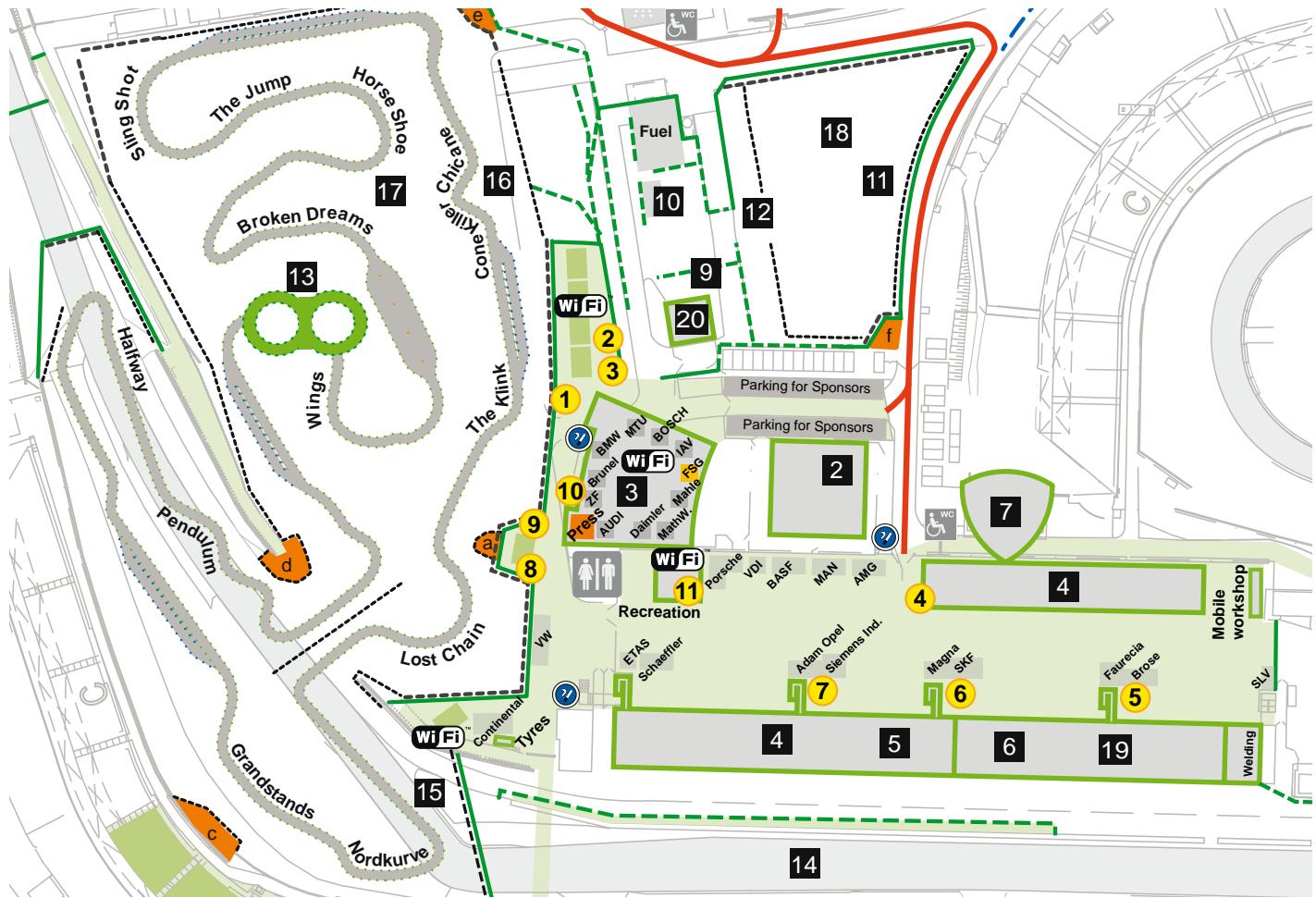
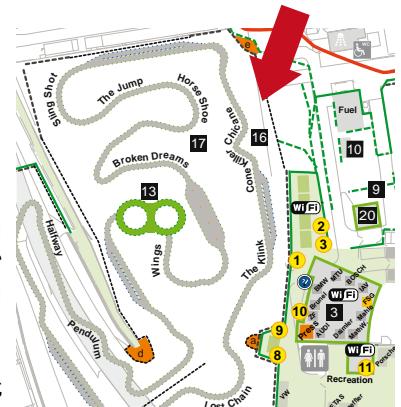
Location: Dynamic area

The endurance track will be set up Sunday. Everybody with a dynamic pass can visit the track before the endurance starts. The colouring of the cones is similar to the Autocross event. The three additional overtaking lanes are marked with blue cones.

The starting order for Endurance results from the Autocross event. The slowest FSC/FSE car starts at 08:30. The following car starts 3 minutes later. Due to weather conditions, the starting order may change. The valid order will be announced at 21:30 on Saturday and it will be displayed at the FSG forum. During the driver change, two scrutineers check the car. After successful driver change, the second driver drives to the entrance gate. If a marshal causes the driver change to take longer than the allowed 3 minutes, the time caused by the marshal will be subtracted. Timekeeping is watching for these incidents.

Cars that get a blue flag please drive into the next overtaking lane. You do not have to slow down before the overtaking lanes. Please start slowing down when you are in the overtaking lane NOT before. For the faster car, it is necessary to not follow the car in front too closely. Otherwise serious damage may be caused if the cars touch each other. Rear-ending a slower car will definitely lead to a disqualification of the faster car!

All vehicles that successfully finish Endurance and those that make it past the driver change must report to the Parc Fermé. They will stay there until 30 minutes after the time limit for appeal.



Dynamics Area on Saturday afternoon – Autocross & Sunday - Endurance/Testing

4 STATIC EVENTS

4.1 ENGINEERING DESIGN AND COST ANALYSIS EVENT - PROCEDURE

The judging area will be located on the 2nd floor of the pits. The cars will be liftet with the FSG car lift (see figure). The cars needs to be at the lift 1 hour before the judging will start. Please be aware that when moving the vehicle from the elevator to the judging bay chapters "2.5.16 How to Wheel the Car (FSC)" & "2.5.17 How to Wheel the Car (FSE)" still apply!

The engineering design event and cost analysis will be back to back. As a team you will have 10 minutes to setup your car and all presentation devices like charts, boards etc. within in the judging bay assigned to you (no equipment like tables, boards etc. will be provided by FSG). Your team will stay in this judging bay for both events. After finishing the first event, you will have a 10 minute break, before the second static event. The judges will come to your judging bay. After the second event you are kindly requested to leave the judging area immediately. To find out your judging bay and judging times, please check the schedule on the website or on the event.



Team & Car Photo

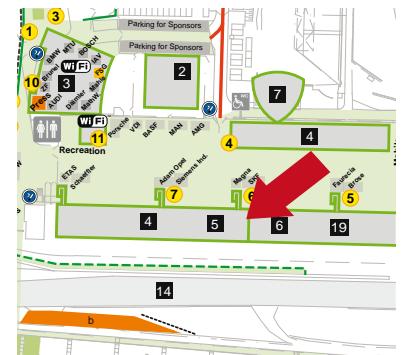
After these two static events, we will take a photo of your team and car while you are waiting for the elevator which carries your car down to the ground level. Please ensure that any team members that did not participate in the static events are available for the picture.

4.2 ENGINEERING DESIGN EVENT

| | | | | |
|-----------|-----|-----------|---------------|---------------------|
| Schedule: | Thu | 11 August | 13:15 – 18:00 | Design Event (FSE) |
| | Fri | 12 August | 08:30 – 17:15 | Design Event (FSC) |
| | Fri | 12 August | 19:00 – 20:30 | Design Finals (FSE) |
| | Sat | 13 August | 19:00 – 21:30 | Design Finals (FSC) |

Location: Marquee above pits (Design Event)
FSG Forum (Design Finals)

Chief Judges: Pat Clarke



Judging Sequence

At Formula Student Germany, design judging will involve two parts:

- 1) Initial judging of all vehicles
- 2) Final judging ranking the top vehicles.

Here are some tips to help you score higher in the engineering design event: Be on time! Make sure your car is in race-ready condition and your team members are well prepared. Bring all engineering documentation with you. You should start with a 3-5 minute overview presentation of the car. It is up to you how you use this presentation time: introducing the team, the car or the design goals etc. This presentation time will be followed by around 40 minutes discussion with the judges.

To score high in the design event, we would suggest you to bring all necessary papers with you, which underline your engineering work. If you have done any tests, bring the results with you. Judges only believe what they see, not what you tell them. Read the Carroll Smith "Everything You Wanted to Know about Design Judging" paper available on the Formula SAE website. There is no time limit in the design finals.

The design finals are not public. The number of team members during design finals depends on the number of finalists and will be published with the list of finalists. It is up to your team to be punctual at the design finals - late entrance is not possible.

The judges will be around on Friday and Saturday. Feel free to ask them about your car. They will be more than happy to answer all your questions.

On Saturday from 8:00 - 9:00 the Design Review will take place and from 9:00 - 11:00 there will be the Design Feedback - Judges meet Team Members (both on Marquee above pits).

4.3 COST ANALYSIS EVENT

Schedule: Thu 11 August 13:15 – 18:00 Cost Event (FSE)
Fri 12 August 08:30 – 17:15 Cost Event (FSC)

Location: Marquee above pits

The Cost Report

A printed copy of the report must be presented to the judges during the cost event. The cost report is judged on the basis of the cost of the car and quality of the cost report. The cost of the car is determined by the cost of the parts and fabrication using established manufacturing practices. The report will follow the guidelines set forth in the published rules. From this analysis the judges (in 8 distinct areas of expertise) will determine if all parts and processes were included. The judges will add penalties if costs are unreasonably low (by experience of the judges), if errors are detected, or if items are omitted.



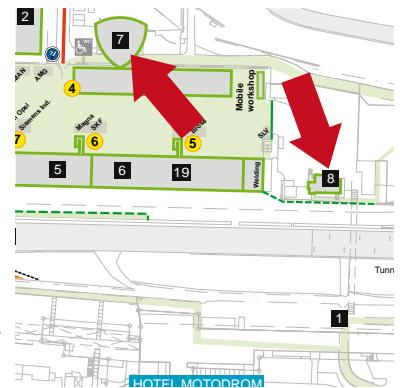
The Real Case Situation

Like any other situation in real life, nobody knows what's coming next. Teams will be given a specific task after the submission of their cost reports. This task is developed by the judges and steering committee members of Formula Student Germany. The teams have to present their solutions in a 10 minute presentation during the cost event.

4.4 BUSINESS PLAN PRESENTATION EVENT

Schedule: Thu 11 August 13:30 – 18:00 Presentation (FSE)
Thu 11 August 19:00 – 20:00 Finals (FSE)
Fri 12 August 09:00 – 18:30 Presentation (FSC)
Fri 12 August 20:00 – 21:00 Finals (FSC)

Location: BW Tower, Start-Finish Building (Presentation)
Marquee above pits (Finals)



The Presentation

Competitors are to make a presentation to upper level executives of an imaginary manufacturer/investor. The presentation should tie together all factors that would influence the marketability and manufacturability of their design. The technical aspects of the vehicle design should be presented to reinforce or support performance claims but should be reduced to the maximum necessary for an investment decision. The competitors should show an understanding of the marketplace and the targeted customer. Furthermore they should show how their design fits into its expected market and how it is completed to a business model. Competitors must convince the judges that their prototype and the related concept represents a profitable enterprise for the manufacturer/investor and that is simply an attractive investment.

Judging Process

The business plan presentation event will be held in a three step approach. In advance, every team has to submit an executive summary. The first presentation round (incl. deep dive topic) will be relevant for all teams and the finals will be relevant only for the top 3 - 5 teams.

Executive Summary

Prior to the business plan presentation event the teams have to hand in an executive summary. This summary must not exceed one page. The executive summary should contain a brief description of the team's business plan, the two most outstanding technical features of the car, and the production costs of prototype and series.

Part of presentation: Deep Dive Topic (DDT)

After the submission of the executive summary, the teams will receive a specific deep dive topic from the presentation judges prior the competition. Each team has to present this special deep dive topic in a detailed way as a part of the team's business plan presentation to the judges.

First Presentation Round

During the first round, each team gets the opportunity to present to the judges. Therefore, the overall group of judges is divided into 10 small groups (of 3 judges each), who will together visit the team presentations. The judge groups will change during the day. At the end of each presentation, the judges are requested to ask questions.

Schedule for each presentation:

- » Maximum 10 minutes for set-up & preparation
- » 10 min for presentation
- » 5 min for questions
- » 5 min for De-briefing and scoring decision of the judges
- » 10 min for instant feedback to the teams
- » 5 min de-installation

→ 45 minutes maximum for each presentation

This time schedule needs to be followed strictly to not disrupt the overall time schedule for the whole day.

During the presentations, only judges and the presenting team participate. Guests may be allowed to attend at the discretion of any steering committee member or the team.

Finals

The best 3 to 5 teams will reach the presentation finals. These finals will be held in the evening in the marquee above the pits. The teams will present to the complete group of judges and to all others interested (i.e. other team etc.).

The 3 to 5 teams will present directly one after the other without any questions/interruptions by the judges. Afterwards, the judges will hold a short de-briefing and decide on a ranking.

The scores of the finalists are:

- Top 1: 75
- Top 2: 74
- Top 3: 73
- Top 4: 72
- Top 5: 71

If a team does not attend the finals despite its nomination, it will automatically receive 71 points. If a team misses their allocated period, the team will receive zero presentation points. The team that makes the best business presentation (regardless of the quality of the car) wins the event.

5 RESULTS

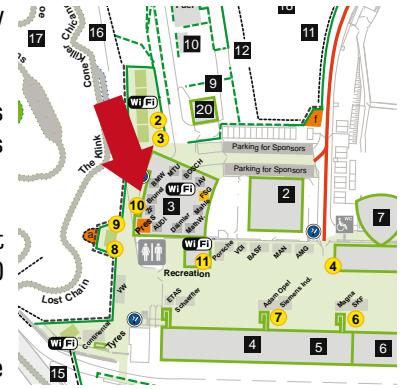
5.1 PUBLISHING OF RESULTS

The results will be posted on the results board in the FSG Forum as soon as they are available. Furthermore, they will be published online at the FSG website.

Endurance Scores are posted in 2 steps. Before publishing the times, the penalties are posted, because those are finished before the data of the 2 timing systems are cross checked. In the second step, the endurance times are published.

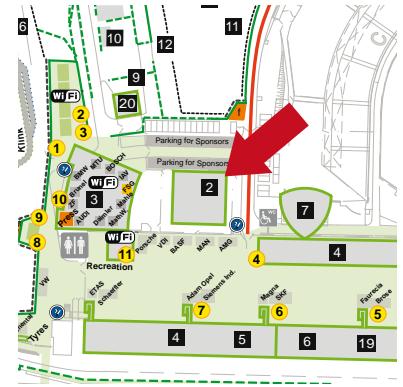
The time slot for the protests is printed on the results page. Please note that the protest time for the overall results could be on Monday morning from 9:00 – 10:00.

Please visit the results board at the FSG Forum regularly and listen to the announcements.



5.2 PROTESTING OF RESULTS

- 1) Required Review - Any team that intends to protest a rule, score, judge's decision or any other aspect of the competition, must present the issue to the FSG rules organizers, represented by Frank Röske for discussion, and possible resolution before the protest is filed. If you cannot locate Frank Röske, contact event control.
- 2) Cause for Protest - A team may protest any rule interpretation, score or official action (unless specifically excluded from protest) which they feel has caused some actual, non-trivial, harm to their team, or has had a substantive effect on their score. Teams may not protest rule interpretations or actions that have not caused them any substantive damage.
- 3) Protest Period - Protests must be filed within one hour after the action being protested has occurred or the scores for the activity involving the protest subject are posted.
- 4) Protest Format - Protests must be handed in in a written form and submitted by the team captain to Henning Nissen. If you cannot locate Henning Nissen, contact event control.
- 5) Protest Bond - The protesting team must post a 25 points bond to be deducted from their score if the protest is denied.
- 6) Decision - The decision of the officials regarding any protest is final.



6 ADDITIONAL INFORMATION

6.1 INTERNET

Free Internet Access

The Hockenheimring GmbH will provide free internet access to all teams & guests.
Please use the password 19322016 in the public network (probably FSG_Wifi).



Technical details for advanced users

- » Standard: IEEE 802.11 g/n
- » Security: none (please use a VPN provider for encryption)

With use of the provided wireless access, the user accepts the following bids:

- » Do not make any illegal downloads, particular called "filesharing" (Exchange of foreign music, films, photos, videos etc. Peer-to-peer networks).
- » Do not use any chargeable services such as subscriptions, gamblings and contests etc. as well as conclude on contracts, on chargeable services and items (orders at online stores, eBay, online games, etc.).
- » There must be no pornographic or violent websites be visited.
- » It may have no other illegal activities be done (for example: offend or embarrass people; put photos of strangers online; publish photos without the owners permission, violent lyrics posting etc.).
- » In case of a violation of law and a violation of these rules the polluter has the personal liability.
- » The internet connection is provided free and voluntarily.
- » The provider can access the internet at any time, especially, at the suspicion of the breaking of German law or against these rules deny.
- » If it is suspected that the internet has been used illegal or contrary to these rules, the user has to provide information to the seller truthfully on the nature, timing and duration of internet usage.

6.2 PHARMACIES

- » Alte Apotheke (Hockenheim)
Untere Hauptstr. 5, 68766 Hockenheim
Tel.: 06205/18472
- » Central-Apotheke (Hockenheim)
Karlsruher Str. 11, 68766 Hockenheim
Tel.: 06205/292040
- » Engel-Apotheke (Hockenheim)
Heidelberger Str. 3, 68766 Hockenheim
Tel.: 06205/7173
- » Linden-Apotheke (Hockenheim)
Schwetzinger Str. 18, 68766 Hockenheim
Tel.: 06205/15544
- » Löwen-Apotheke (Hockenheim)
Reilinger Str. 2, 68766 Hockenheim
Tel.: 06205/288928
- » Stadtapotheke (Hockenheim)
Heidelberger Str. 11, 68766 Hockenheim
Tel.: 06205/4277
- » Wasserturm-Apotheke (Hockenheim)
Karlsruher Str. 25, 68766 Hockenheim
Tel.: 06205/4542

6.3 SUPERMARKETS

- » Aldi Süd (Hockenheim)
Lußheimer Str. 10, 68766 Hockenheim
- » Lidl (Hockenheim)
Lußheimer Str. 6, 68766 Hockenheim
- » Mini Mal-Markt (Hockenheim)
Lußheimer Str. 2, 68766 Hockenheim
Tel.: 06205/14231
- » PENNY-MARKT (Hockenheim)
Ernst-Brauch-Str. 64-66, 68766 Hockenheim
Tel.: 06205/923218
- » PENNY-MARKT (Hockenheim)
Auweg 3, 68766 Hockenheim
Tel.: 06205/923227

7 CHANGE LOG

The following changes have been made since the original release of this document:

23rd of April 2016:

initial release

11th of July 2016:

1. addition of contact telephone numbers
- 2.1. Site Plan: update to the latest version
- 2.2. Schedule: update to the latest version
- correction of spelling mistakes (general)
- 3.2.2.2. Change from 1 hour of E-Scrutineering to 2 hours of E-scrutineering time per team.

28th of July 2016

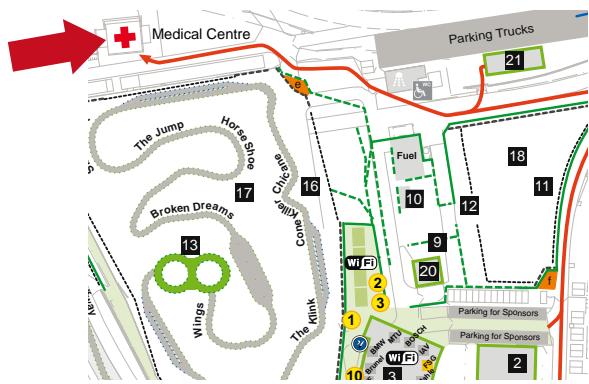
- 2.4.1 Registration: new picture: Truck Parking
- 2.2. Schedule: update to the latest version
- 6.1 Free Internet Access
- correction of wrong dates (general)

EMERGENCY INFORMATION

Minor Injury

Medical Centre:

Please accompany the injured person to the Medical Centre. Emergency aid is provided there. The Medical Centre is occupied each day round-the-clock.



Severe Injury

Contact someone with a two-way radio:

Every Official and Security has two-way radio. Ask them to call the Medical Centre or an ambulance on channel 11.

Call an ambulance:

Call an ambulance yourself if someone is severely injured and needs urgent help. The Emergency Number for every phone and mobile phone is **112**.

During dynamics:

On Saturday and Sunday an ambulance is on site during the dynamic events. To contact them ask someone with a two-way radio (Official, Security) to call them.

Hospital:

Main Hospital, Kreiskrankenhaus (Schwetzingen), Bodelschwinghstrasse 10, 68723 Schwetzingen
phone: +49 (0) 6202 / 84-30 (See also directions in the Event Handbook in chapter 1.3)

Emergency Numbers

In case of an emergency beyond competition times call 112. This number works with each phone, also with mobile phone or coin-operated telephone as international GSM-standard. It is always free of charge.

Officials

| | |
|--------------------------------|------------------------|
| Pit Marshal Konrad Paule | Tel. +49 151 560 74700 |
| Pit Marshal Sebastian Seewaldt | Tel. +49 151 560 74701 |
| Event Control Daniel Ahrens | Tel. +49 151 560 74702 |
| Back Office Sven Grundner | Tel. +49 151 560 74703 |

(In case of an emergency please call one of them, no matter what time it is.)

112

Emergency Call Contents

The emergency control centre will ask you some questions to ensure proper help for you. To support you at your call, here are some standard questions and some hints for your answers in English and German.

Who is calling? (*Wer ruft an?*)

Say your name and your telephone number for callbacks.

Digits in German: 0 (null), 1 (eins), 2 (zwei), 3 (drei), 4 (vier), 5 (fünf), 6 (sechs), 7 (sieben), 8 (acht), 9 (neun)

Where did it happen? (*Wo ist es passiert? / Wo ist es geschehen?*)

the event site has the address "Hockenheimring, Sachshaus, Am Motodrom", make it more precise!: pit lane (*Boxengasse*), dynamic area (*Fahrerlager*);

the address for campsite C2 near the Motodrom Hotel " Hockenheimring, Zeltplatz C2 beim Motodrom Hotel" and for campsite C3 on the other side of the highway "Hockenheimring, Zeltplatz C3 an der Continental Straße"

What happened? (*Was ist passiert? / Was ist geschehen?*)

accident (*Unfall*), traffic accident (*Verkehrsunfall*), fire (*Feuer*), fall (*Sturz*), explosion (*Explosion*)

How many people are affected? (*Wie viele Personen sind betroffen?*)

1 (eins), 2 (zwei), 3 (drei), 4 (vier), 5 (fünf), 6 (sechs), 7 (sieben), 8 (acht), 9 (neun), 10 (zehn)

What kind of injury has happened? (*Welche Verletzung liegt vor?*)

fracture (*Knochenbruch*), bleeding (*Blutung*), unconsciousness (*Bewusstlosigkeit*), burn (*Verbrennung*), electric shock (*Stromschlag*), suffocation (*Ersticken*), heart attack (*Herzinfarkt*), shock (*Schock*)

Don't hang up after answering these questions! Wait to hear if the control centre has further questions!