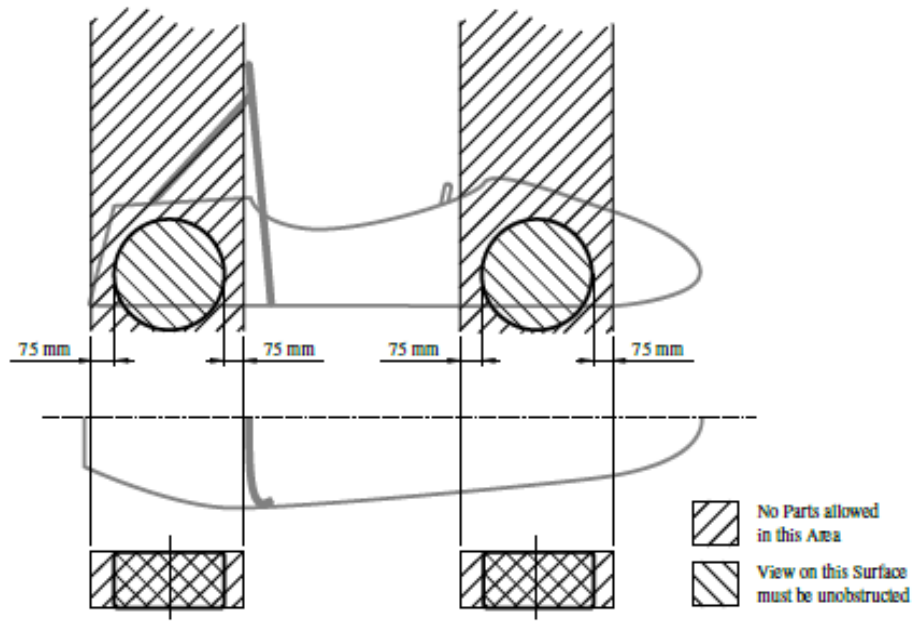
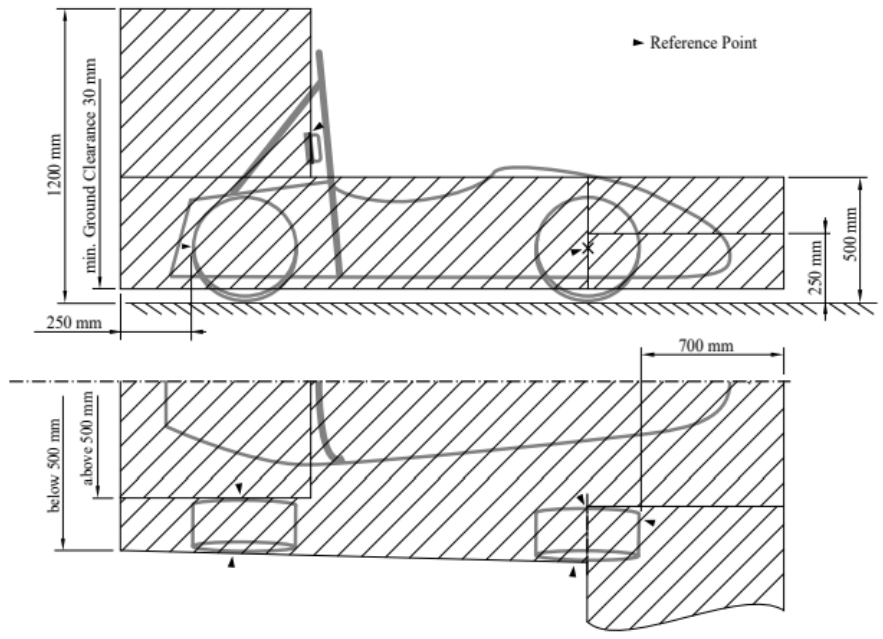
Formula Student Netherlands

Dashboard

2025 Mechanical Inspection Sheet

Car No
University

MECH 3 - FULLY ASSEMBLED WITHOUT DRIVER				
!ONLY FOR CV! NO FUEL IN THE FUEL TANK ! IF YES, EMPTY AT THE PIT				
!ONLY FOR EV! CHECK IF THE TEAM HAS THE ACCUMULATOR INSPECTION STICKER! IF NOT THE ACCUMULATOR MUST NOT BE PRESENT!				
Technical Inspection Sticker (IN1.3)				
BODYWORK & AERODYNAMICS				
No.	Checkpoint	Rule No	Checkbox	Comments
99	• No large holes in bodywork, except for cockpit opening and except for the venting holes	T2.3.1		
100	In any side view in front of the cockpit opening and outside the area defined in T8.2 all parts of the bodywork must have **no external concave radii of curvatures**. Any gaps between bodywork and other parts must be reduced to a minimum.	T2.3.2		
101	**FLOOR PANELS** • Floor panel installed from foot area until firewall. **Gaps must be less than 3mm** • Deflection of floor panels which can ocure with a seated driver or during a race can't cause a gap greater than 3mm • Enclosed chassis structures, structures between the chassis and the ground and every local minimum that can accumulate fluids must have two venting holes of at least 25mm diameter in the lowest part of the structure to prevent accumulation of liquids.	T4.7.1		
102	**GROUND CLEARANCE** • Check if the car has passed ground clearance (M1)	T2.2.1		
AERO GENERAL				
103	• All wings securely attached, deflection may not exceed 25mm when a force of 50 N is placed at any random place in any random direction locally or 10mm when a force of 200N is applied at an surface area of 225cm2 *- Use sandbags to check*	T8		
104	• **Front facing edges** off aero dives must have a radius of 5 mm if horizontal and 3 mm if vertical and 38mm radius at 45° at the nosecone	T8		
105	• Attachment of the rear wing must be in the nodes of the MAIN HOOP (MAIN HOOP BRACINGS)			
106	No parts are allowed within the 75 mm keep out zone (see image below)  Figure 3: Keep-out-zones for the definition of an open-wheeled vehicle.	T8		
107	**FRONT AERO (EV - WITH ACCUMULATOR STICKER AND ACCUMULATOR INSIDE)** Measurements according T8 aerodynamic devices, figure 16 (Provided in scrutineering area)	T8		

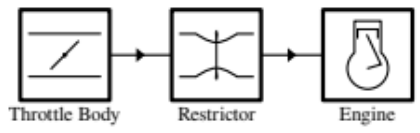
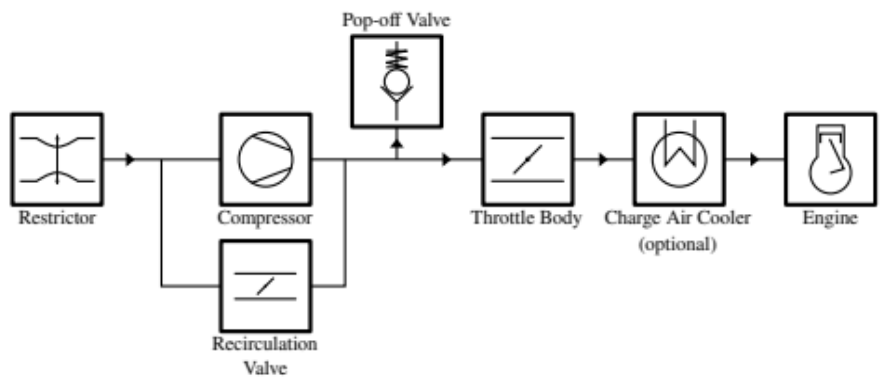
108	**REAR AERO** **(EV - WITH ACCUMULATOR STICKER AND ACCUMULATOR INSIDE)** Measurements according T8 aerodynamic devices, figure 16 (Provided in scrutineering area)  Figure 16: Maximum dimensions and positioning of aerodynamic devices. The positioning space is further restricted, see T 2.1.	T8		
109	**TSAL** The TSAL must: •Be located lower than the highest point of the main hoop and including the mounting within the roll over protection envelope ,seeT1.1.15. •Be no lower than 75mm from the highest point of the main hoop. •Not be able to contact the driver's helmet in any circumstances. The entire illuminated surface of the TSAL must be clearly visible: •Except for angles less than 10° which are blocked by the main hoop. •From a point 1.60m vertically from ground level within 3m horizontal radius from theTSAL. •In direct sun light.	EV4.10.8		

COOLING SYSTEM (T7.2)

	Checkpoint	Rule No	Checkbox	Comments
	COOLING GENERAL	T7.2		
110	**COOLANT FLUID** • **CV** - Water-cooled engines must only use **plain water.** • **EV** - TS components may only use **plain water, air or oil** as the coolant, see T 1.2.2	T 7.2.1T 7.2.2		
111	• Cooling systems using plain water (except outboard wheel motors and their cooling hoses) must have a heat resistant (Permanently rated for at least 100 °C), **rigid and rigidly mounted cover** which meets the requirements of T 4.8.2.	T 7.2.3		
112	• Any cooling overflow system must be equiped with a catch tank, located behind the firewall, below shoulder level • Cooling catch cans minimal 10% fluid volume or 100ml, hichever is greater.	T 7.2.8T 7.2.6		
113	• Other fluids must have a minimum volume of 10% of the fluid being contained or 900 ml whichever is greater.	T 7.2.5		
114	• No fluid hoses out of the chassis or monocoque in direct line of sight of driver exceptions for in-wheel motors. Without stone-strike protection			
115	• All parts of the engine cooling and lubrication system, **including their mountings**, must be rated for **at least 120 °C** or the temperatures the respective fluid may reach, **whichever is higher**.	T 7.2.7		
116	Any catch can must vent through a hose with a minimum internal diameter of 3mm down to the bottom level of the chassis and must exit outside the bodywork.	T7.2.9		
117	**FLUID LEAKS** **No** type of **fluid leak** (Oil, grease, coolant, fuel, Brake fluid) is permitted			

DRIVE TRAIN SHIELDS AND GUARDS (T7.3)				
	Checkpoint	Rule No	Checkbox	Comments
118	**Oil pump lower than chassis** • The lowest point of any lubrication system can only be lower than the line between the lowest point of the main hoop and the lowest chassis member behind the lubrication system if it is protected from hitting the ground by a structure mounted directly to the chassis.	T7.3.1		
119	Exposed **rotating final drivetrain parts**, such as **gears**, **clutches**, **chains** and **belts** must be fitted with scatter shields. Scatter shields and their mountings must: • Be constructed of non-perforated 2 mm steel or 3 mm aluminium alloy 6061-T6. •Cover chains and belts from the drive sprocket to the driven sprocket/chain wheel/belt or pulley. • Start and end parallel to the lowest point of the driven sprocket/chain wheel/belt or pulley. • Scatter shields for chains and belts must be centered on the centerline of the chain or belt and remain aligned with the chain or belt under all conditions. • For non-metallic chains and belts: 3mm nonperforated aluminum alloy 6061-T6. •The minimum width of the scatter shield should be at least three times the width of the chain or belt.	T 7.3.2		
120	• All **fasteners attaching scatter shields, guards <u>and their mountings</u>** must be **6mm** metric grade 8.8 or stronger and must comply with T10.1.	T7.3.2		
121	• Finger guards are required to cover any parts that spin while the vehicle is stationary. Finger guards may be made of lighter material, sufficient to resist finger forces. Mesh or perforated material may be used but must prevent the passage of a 12mm diameter object through the guard.	T7.3.5		
122	**MOTORCASING** • EV - Motorcasings must have a housing or separate scatter shield from **non perforated 2 mm aluminium alloy 6061-T6 or equivalent.** The scatter shield may be split into two equal sections, each 1 mm thick.	T7.3.4		
123	**GREASE COVERS** • All covers off drivesytems have to be fixated so the grease wont come out			
FIREWALL (T4.8)				
No.	Checkpoint	Rule No	Checkbox	Comments
124	The firewall must separate the cockpit from all components of - the fuel supply system - hydraulic fluid except brake system and dampers - flammable liquids - the low voltage battery - any TS component (EV1.1.1)	T 4.8.1		
125	• The firewall must cover any straight line between the parts mentioned in T 4.8.1 and any part of the tallest driver below a plane 100 mm above the bottom of the helmet.	T 4.8.2		
126	**HEAT INSULATION** • Adequate heat insulation must be provided to ensure that the driver is not able to contact any parts of the vehicle with a surface temperature above 60 °C. The insulation may be external to the cockpit or incorporated with the driver's seat or firewall. The design must address all three types of heat transfer with the following minimum requirements between the heat source and the part that the driver could contact: (a) **Conduction insulation** by: (i) No direct contact, or (ii) a heat resistant, conduction insulation material with a minimum thickness of 8 mm. (b) **Convection insulation** by a minimum air gap of 25 mm. (c) **Radiation insulation by**: (i) A solid metal heat shield with a minimum thickness of 0.4 mm or (ii) reflective foil or tape when combined with T 4.6.2.a.ii.	T 4.6.2		

127	• The firewall must be a **non-permeable surface** made from a **rigid, fire resistant materia**l, see T 1.2.1, which must be **rigidly mounted** to the vehicle's structure. A material is considered Fire Retardant if it meets one of the following standards *(ask for proof)* : • **UL94 V-0** for the minimum used material thickness • **FAR 25.853**(a)(1)(i) Equivalent standards are only accepted, if the team shows equivalence and this is approved by the officials **prior to the event.**	T1.2.1T 4.8.3		
128	• Any firewall must seal completely against the passage of fluids, especially at the sides and the floor of the cockpit.	T 4.8.4		
129	• Pass-throughs for wiring, cables, etc. are permitted if grommets are used to seal the passthrough.	T 4.8.5		
130	• Multiple panels may be used to form the firewall but must overlap at least 5mm and be sealed at the joints. Any sealing material must not be vital to the structural integrity of the firewall.	T 4.8.6		
131	**EV ONLY** The TS firewall between driver and TS components must be composed of two layers: • One layer, facing the TS side, must be made of aluminium with a thickness of at least 0.5 mm. This part of the TS firewall must be grounded according to EV 3.1. • The second layer, facing the driver, must be made of an electrically insulating and fire retardant material, see T 1.2.1. The second layer must not be made of CFRP. • The thickness of the second layer must be sufficient to prevent penetrating this layer with a 4 mm wide screwdriver and 250 N of force. A sample of the TS firewall must be presented at technical inspection.	T 4.8.7		
132	**EV ONLY** • Conductive parts, except for the chassis and firewall mounting points, may not protrude through the TS firewall or must be properly insulated on the driver's side. The driver must not be able to touch uninsulated firewall mounting points while operating the vehicle.	T 4.8.8		
133	**EV ONLY** • TS parts outside of the envelope, see EV 4.4.3, do not need a firewall.	T 4.8.9		
BELOW CV CLASS ONLY				
	Check box if car is EV	ONWAAR		
CV ONLY: ENGINE, FUEL SYSTEM AND ELECTRICS				
No.	Checkpoint	Rule No	Checkbox	Comments
134	**ENGINE** • The engine(s) used to power the vehicle must be piston engine(s) using a four-stroke primary heat cycle with a displacement not exceeding 710 cm3 per cycle.	CV1.1		
135	• Each vehicle must be equipped with an on-board starter, which must be used to start the vehicle.	CV1.2		
136	• There must be a green light next to the engine start button (as defined in CV1.2.2), that indicates that the gearbox is in neutral. It must be marked with the letter "N". This letter must have a minimum height of 25 mm.	CV1.2.3		
137	**SURFACE ENVELOPE** • All parts of the engine air and fuel control systems (including the throttle and the complete air intake system, including the air filter and any air boxes) must lie within the surface envelope, see T1.1.18.).	CV1.3.1		
138	**AIR INTAKE** • Any portion of the air intake system that is less than 350mm above the ground must be shielded from side or rear impact collisions by structure built according to T3.15 (with exception of the first point under T3.15.1) and must follow T3.16 when having bolted attachments.	CV1.3.2		
139	• The intake manifold must be securely attached to the engine block or cylinder head with brackets and mechanical fasteners. The threaded fasteners used to secure the intake manifold are considered critical fasteners and must comply with T10.Min M4, grade 8.8 OEM type M3, grade 8.8	CV1.3.3		

140	• Intake systems with significant mass or cantilever from the cylinder head must be supported to prevent stress to the intake system. Supports to the engine must be rigid. Supports to the chassis must incorporate isolation to allow for engine movement and chassis torsion.	CV1.3.4		
141	• The vehicle must be equipped with a throttle body. The throttle body may be of any size or design. The throttle must be actuated mechanically by a foot pedal, i.e. via a cable or a rod system, see CV1.5, or by an ETC system, see CV1.6.The throttle system mechanism must be protected from debris ingress to prevent jamming.	CV1.4		
142	**THROTTLE** • The throttle actuation system must use at least two return springs located at the throttle body, so that the failure of any one of the two springs will not prevent the throttle returning to the idle position. Each return spring must be capable of returning the throttle to the idle position with the otherdisconnected. Springs in the Throttle Position Sensor (TPS) are not acceptable as return springs.	CV1.5		
143	• Throttle cables must be located at least 50mm from any exhaust system component and out of the exhaust stream.Throttle cables or rods must have smooth operation and must not have the possibility of binding or sticking. They must be protected from being bent or kinked by the driver's foot during operation or when entering the vehicle. A positive pedal stop must be incorporated on the accelerator pedal to prevent over-stressing the throttle cable or actuation system.	CV1.5		
144	**ELECTRONIC THROTTLE CONTROL** Rule only applies if ETC is used. The ETC system must be equipped with at least the following sensors: • Accelerator Pedal Position Sensors (APPSs) as defined in T11.8. • Two Throttle Position Sensors (TPSs) to measure the throttle position	CV1.6		
145	When power is removed, the electronic throttle must immediately close at least to idle position 5%. An interval of one second is allowed for the throttle to close to idle, failure to achieve this within the required interval must result in immediate disabling of power to ignition, fuel injectors and fuel pump. This action must remain active until the TPS signals indicate the throttle has returned to idle position 5% for at least one second.	CV1.6.5		
146	The electronic throttle must use at least two sources of energy capable of returning the throttle to the closed position. One of the sources may be the device that normally actuates the throttle, e.g. a DC motor, but the other device(s) must be a return spring that can return the throttle to the idle position in the event of a loss of actuator power.	CV1.6.7		
147	**RESTRICTOR** • Gasoline fueled vehicles - 20mm • E 85 fueled vehicles - 19mm • For naturally aspirated engines, the sequence must be: throttle body, restrictor, and engine, see figure 17 • For turbocharged or supercharged engines, the sequence must be: restrictor, compressor, throttle body, engine, see figure 19  Figure 18: Intake configuration for naturally aspirated engines.  Figure 19: Intake configuration for turbocharged or supercharged engines.	CV1.7		
148	**FUEL TANK** • The fuel tank must be located within the rollover protection envelope, see T1.1.16, except the fuel filler neck if it is 350mm above the ground.	CV2.2.1		
149	• All parts of the fuel storage and supply system must lie within the surface envelope, see T1.1.18..	CV2.2.2		

150	• In side view no portion of the fuel system can project below the lower surface of the chassis.	CV2.2.2		
151	• All parts of the fuel storage and supply system must be adequately protected against any heat sources and located at least 50mm from any exhaust system component.	CV2.2.3		
152	• All parts of the fuel system which can come in contact with the fuel must be rated for permanent contact with fuel. *Check RESIN datasheet for carbon fiber fuel tanks.*	CV2.2.4		
153	• The fuel tank is defined as the part of the fuel containment device that is in contact with the fuel. It may be made of a rigid material or a flexible material.	CV2.3.1		
154	• The fuel tank must be securely attached to the vehicle structure with mountings that allow some flexibility such that chassis flex cannot unintentionally load the fuel tank.	CV2.3.2		
155	• The fuel tank must not touch any part of the vehicle other than its mounting and parts of the fuel system at any time.	CV2.3.3		
156	**FUEL LINES** Fuel lines between fuel tank and fuel rail and return lines must have: • Reinforced rubber fuel lines with an abrasion protection with a fuel hose clamp which has a full 360° wrap, a nut and bolt system for tightening and rolled edges to prevent the clamp cutting into the hose, or • Metal braided hoses with crimped-on or reusable, threaded fittings. • be rated for temperatures of at least 120 °C 	CV2.4.1		
157	Fuel lines must be securely attached to the vehicle and/or engine.	CV2.4.4		
158	The following requirements apply to LPI (low pressure injection <10 bar) fuel systems: • The fuel lines must comply with CV2.4. • The fuel rail must be securely attached to the engine cylinder block, cylinder head, or intake manifold with mechanical fasteners. The threaded fasteners used to secure the fuel rail are considered critical fasteners and must comply with T10. • The use of fuel rails made from plastic, carbon fiber or rapid prototyping flammable materials is prohibited. However, the use of unmodified Original Equipment Manufacturer (OEM) Fuel Rails manufactured from these materials is acceptable.	CV2.5.1		
159	The following requirements apply to HPI and DI fuel systems: • All high pressure fuel lines must be stainless steel rigid line or Aeroquip FC807 smooth bore PTFE hose with stainless steel reinforcement and visible Nomex tracer yarn. Use of elastomeric seals is prohibited. Lines must be rigidly connected every 100mm by mechanical fasteners to structural engine components. • The fuel rail must be securely attached to the engine cylinder head with mechanical fasteners. The fastening method must be sufficient to hold the fuel rail in place with the maximum regulated pressure acting on the injector internals and neglecting any assistance from in-cylinder pressure acting on the injector tip. The threaded fasteners used to secure the fuel rail are considered critical fasteners and must comply with T10. • The fuel pump must be rigidly mounted to structural engine components. • A fuel pressure regulator must be fitted between the high and low pressure sides of the fuel system in parallel with the DI boost pump. The external regulator must be used even if the DI boost pump comes equipped with an internal regulator. • Prior to the tilt test specified in IN7, engines fitted with mechanically actuated fuel pumps must be run to fill and pressure the system downstream of the high pressure pump.	CV2.5.2		

160	The fuel tank must have a filler neck which: • has at least an inner diameter of 35mm at any point between the fuel tank and the top of the fuel filler cap. • is angled at no more than 30° from the vertical • is accompanied by a clear fuel resistant sight tube above the top of the fuel tank with a length of at least 125mm vertical height for reading the fuel level, see figure 19. • is made of material that is permanently rated for temperatures of at least 120 °C. • a clear filler neck tube may be used as a sight tube.	CV2.6		
161	A permanent, non-moveable, clear and easily visible fuel level line must be located between 12mm and 25mm below the top of the visible portion of the sight tube. This line will be used as the fill line for the tilt test (IN7.1), and before and after the endurance test to measure the amount of fuel used during the endurance event.	CV2.6.3		
162	All fuel vent lines must be equipped with a check valve to prevent fuel leakage when the tank is inverted. All fuel vent lines must exit outside the bodywork.	CV2.8.2		
163	Fuel type sticker near the fuel filler neck			
	GAS CYLINDERS/TANKS			
164	Proprietary manufactured, certified & labeled. Non-flammable gas, regulator directly on tank max. 10 bar (145 psi), securely mounted to chassis or engine, or in structural side pod, within the rollover envelope, not in cockpit, insulated from heat sources, appropriate lines & fittings for max. pressure of system. Positively retained, i.e. no tie-wraps.	T 9.1		
	EXHAUST			
165	The exhaust outlet must be routed to the side or rear of the vehicle and so that the driver is not subjected to fumes at any speed considering the draft of the vehicle. The application of fibrous/absorbent material, e.g. “headerwrap”, to the outside of an exhaust manifold or exhaust system is prohibited.	CV3.1.1		
166	The exhaust outlet(s) must not extend more than 450mm behind the centerline of the rear axle and shall be no more than 600mm above the ground.	CV3.1.2		
167	Any exhaust components (headers, mufflers, etc.) that protrude from the side of the body in front of the main hoop must be shielded to prevent contact by persons approaching the vehicle or a driver exiting the vehicle. The temperature of the outer surface must not be harmful to a person touching it.	CV3.1.3		
	BRAKE LIGHT			
168	Only one RED brake light, clearly visible from the rear; on vehicle centerline; height between wheel centerline & driver’s shoulders. Round, triangle, or rectangular on black background. 15 cm2 minimum illuminated area. LED strips OK if elements closer than 20mm apart and total length > 150 mm.	T 6.3		
	SHUTDOWN CIRCUIT			
169	The shutdown circuit directly controls all electrical power to the ignition, fuel injectors and all fuel pumps. It must act through a minimum of two mechanical relays. One relay for the fuel pump and at least one relay for injection and ignition.	CV4.1		
170	An LVMS according to T11.2 must completely disable • [EV ONLY] power to the LVS • [CV ONLY] power from the Low Voltage (LV) battery and the alternator to the LVS The LVMS must be mounted in the middle of a completely red circular area of 50mm diameter placed on a high contrast background. The LVMS must be marked with “LV” and a symbol showing a red spark in a white edged blue triangle. The LVMS must be removable in off state, which is in the vertical position and have a marker for the off and on positions.	T11.3		

171	**SHUTDOWN BUTTONS** A system of three shutdown buttons must be installed on the vehicle. Each shutdown button must be a push-pull or push-rotate mechanical emergency switch where pushing the button opens the shutdown circuit, see EV6.1 and CV4.1. One button must be located on each side of the vehicle behind the driver's compartment at approximately the level of the driver's head. The minimum allowed diameter of the shutdown buttons on both sides of the vehicle is 40mm. The buttons must be easy reachable from outside the vehicle. One shutdown button serves as a cockpit-mounted shutdown button and must • have a minimum diameter of 24mm • be located in easy reach of a belted-in driver • be alongside of the steering wheel and unobstructed by the steering wheel or any other part of the vehicle The international electrical symbol consisting of a red spark on a white-edged blue triangle must be affixed in close proximity to each shutdown button. Shutdown buttons must be rigidly mounted to the vehicle and must not be removed during maintenance.	T11.4		
172	**INERTIA SWITCH** An inertia switch must be part of the shutdown circuit, see CV4.1 and EV6.1, such that an impact will result in the shutdown circuit being opened. The inertia switch must latch until manually reset. The device must be rigidly attached to the vehicle. It must be possible to demount the device so that its functionality may be tested by shaking it.	T11.5		
173	**BRAKE SYSTEM PLAUSIBILITY DEVICE - BSPD** A standalone non-programmable circuit, the BSPD, must open the shutdown circuit, see EV6.1 and CV4.1, when hard braking occurs, whilst • [EV ONLY] 5kW power is delivered to the motors. • [CV ONLY] the throttle position is more than 25% over idle position. The shutdown circuit must remain open until power cycling the LVMS or the BSPD may reset itself if the opening condition is no longer present for **more than 10 s**. The action of opening the shutdown circuit must occur if the implausibility is persistent for more than 500 ms.	T11.6		
174	**BRAKE OVER-TRAVEL SWITCH - BOTS** A brake pedal over-travel switch must be installed on the vehicle as part of the shutdown circuit, as in EV6 or CV4.1. This switch must be installed so that in the event of a failure in at least one of the brake circuits the brake pedal over-travel will result in the shutdown circuit being opened. This must function for all possible brake pedal and brake balance settings without damaging any part of the vehicle.	T6.2		
175	**LOW VOLTAGE BATTERIES** LV batteries must be securely attached to the chassis and located within the rollover protection envelope Any wet-cell battery located in the cockpit must be enclosed in a non-conductive, water proof (according to IPX7 or higher, IEC 60529) and acid resistant container. Completely closed LV battery cases must have an overpressure relief. Venting gases must be separated from the driver by a firewall. Battery packs based on lithium chemistry **other than lithium iron phosphate (LiFePO4):** • Must have a fire retardant casing, see T1.2.1. • Must include overcurrent protection that trips at or below the maximum specified discharge current of the cells. • Must include overtemperature protection of at least 30% of the cells, meeting EV5.8.3, that trips when any cell leaves the allowed temperature range according to the manufacturer's datasheet, but not more than 60 °C, for more than 1 s and disconnects the battery. • Must include voltage protection of all cells that trips when any cell leaves the allowed voltage range according to the manufacturer's datasheet for more than 500 ms and disconnects the battery. • It must be possible to display all cell voltages and measured temperatures, e.g. by connecting a laptop.	T11.7		

	APPROVAL STATUS		gid=0	
MECH 3	Approval (Control box) (DON'T CHANGE MANUALLY)		ONWAAR	

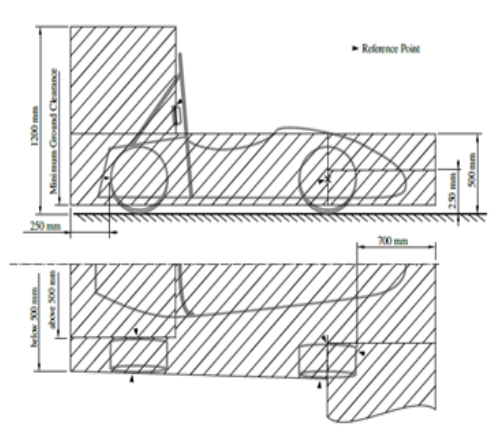


Figure 15: Maximum dimensions and positioning of aerodynamic devices. The positioning space is further restricted, see T 2.1.

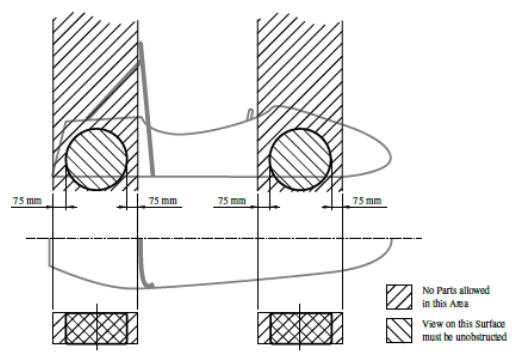


Figure 3: Keep-out-zones for the definition of an open-wheeled vehicle.

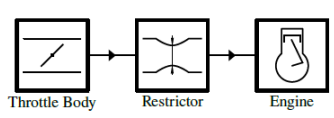


Figure 17: Intake configuration for naturally aspirated engines.

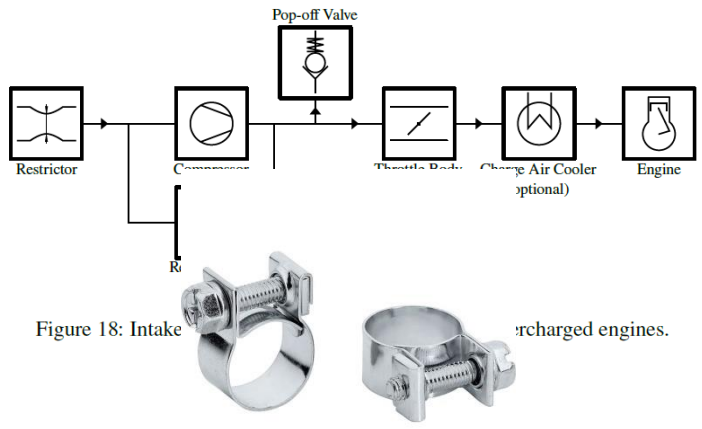


Figure 18: Intake rcharged engines.