

2019 FSAE: TECHNICAL INSPECTION

IMPORTANT: Each page must stay with the car until that specific part of inspection has been completed.

Present the vehicle for inspection in the following order:

- 1a. Safety gear check (bring all items from "Initial Inspection" section below)
- 1b. Technical Inspection
2. Fuel Station & Tilt Table Inspection
3. Noise Level & Braking Performance Inspection

NOTE: If there is a conflict between this form and the rules, the rules prevail.

Initial Inspection: IN.3

<input type="checkbox"/> 1. HELMETS - VE.3.2 <ul style="list-style-type: none">•Closed-face with integral chin guard (no dirtbike helmets).•Face shield integral with helmet, impact resistant material.•Specification: Snell: K2005, K2010, K2015, M2005, M2010, M2015, SA2005, SA2010, SAH2010, SA2015, EA2016; or SFI: 31.1/2005 thru /2015; 41.1/2005 thru /2015; or FIA: 8860-2004, 8860-2010, 8860-2018, 8859-2015.•No camera mounts: VE.2.5.3
<input type="checkbox"/> 2. BALACLAVA - VE.3.3.3 Required for all drivers. Fire Resistant material. Covers head, neck and hair. (No label required.)
<input type="checkbox"/> 3. ARM RESTRAINTS - VE.3.3.7 Required for all drivers. Must be commercially manufactured. (No label required.)
<input type="checkbox"/> 4. DRIVERS' SUITS - VE.3.3.1 Single piece suit, no holes. Must be labeled. Specification: SFI 3-2A/5; or FIA 1986; or FIA 8856-2000
<input type="checkbox"/> 5. GLOVES - VE.3.3.6 Fire Resistant material (not all-leather). No holes. Leather palms allowed only over fire resistant material. (No label required.)
<input type="checkbox"/> 6. SHOES - VE.3.3.5 No holes. Must be labeled. Specification: SFI 3.3; or FIA 8856-2000
<input type="checkbox"/> 7. SOCKS - VE.3.3.4 Fire-resistant material (no cotton; no polyester). Must cover all bare skin. (No label required.)
<input type="checkbox"/> 8. FIRE EXTINGUISHERS - VE.2.3 <ul style="list-style-type: none">•Hand-held, dry chemical (no AFFF or halon), min specification: 10BC; 1A10BC; 34B; 5A 34B; 20BE; or 1A 10BE.•Min 0.9 kg (2 lb). •Two required: must present both at Tech.
<input type="checkbox"/> 9. WET TIRES - T.1.8.2 2.4mm min tread depth. Molded or cut by tire manufacturer. Brand, Compound: _____ Size: _____

Mechanical Inspection

<input type="checkbox"/> 10. DRY TIRES - T.1.8.1 Brand, Compound: _____ Size: _____

CAR NUMBER:

SCHOOL NAME: _____

Transponder number:

Mechanical Inspection: IN.8, Garage Entry

Reminder to teams: bring the following items: <ul style="list-style-type: none">•Car on "Dry Tires"•Structural Equivalency Spreadsheet (SES) copy•Monocoque Laminate Test Specimens (if applicable)•Impact Attenuator Report copy•The Impact Attenuator that was tested (if applicable)•Copies of any submitted Rules Questions including responses For egress (1 driver): •Helmet •Gloves •Arm Restraints•Long pants •Closed-toe shoes
<input type="checkbox"/> 11. First Year Vehicle - GR.7.2.2 New Chassis and is within its initial Competition Year.
<input type="checkbox"/> 12. PUSH BAR - VE.2.2 Always with car (detachable), push & pull, usable by 2 people standing behind the car. EVs: HV disconnect tool, if used.
<input type="checkbox"/> 13. TRANSPONDER - VE.1.5 <ul style="list-style-type: none">•AMB TranX 260 / MyLaps X2 required. •Securely mounted on RHS of car forward of Front Roll Hoop with clear view of ground.
<input type="checkbox"/> 14. TRANSPONDER FUNCTION CHECK (if available)

Driver In, Bodywork On

<input type="checkbox"/> 15. CAR NUMBERS - VE.1.1 On •front & both sides of car, •minimum 150 mm tall, •18 mm stroke & spacing. •White-on-black or B-on-W only. •Background shape: round, oval, rectangular or square. •Visibility must not be obstructed.
<input type="checkbox"/> 16. SAE DECALS - VE.1.3 SAE logo on front OR both sides, in prominent location.
<input type="checkbox"/> 17. SCHOOL NAME - VE.1.2 School name or recognized initials. •Both sides of car, •easily visible location, •50 mm tall min, •Roman letters, •high contrast background.
<input type="checkbox"/> 18. TECH STICKER SPACE - VE.1.4 25 cm wide x 20 cm high available space, located on centerline of upper front bodywork (nose) of car.
<input type="checkbox"/> 19. CAMERA MOUNTS - VE.2.5 <ul style="list-style-type: none">•If >0.25 kg, must be secured by two points (typical GoPro-brand camera is <0.25 kg). •No cameras mounted to helmet.
<input type="checkbox"/> 20. GROUND CLEARANCE - T.1.4 Sufficient clearance so that no part of the car other than the tires will contact the track surface.

Inspector Comments:

Driver In, Bodywork On (Continued)

- ☐ 21. BRAKE LIGHT - T.5.3
 •RED color, •clearly visible from the rear, located 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 20 mm apart and total length > 150 mm (5.9").
 •Sufficient brightness for visible activation in bright sunlight.

Driver Fit

- ☐ 22. VISIBILITY - T.3.8
 100° min field of view to each side. Head rotation OK, or mirrors. If mirrors, must be firmly installed and adjusted.
- ☐ 23. ROLL BAR PADDING - T.4.8
 Installed on any bar that could be hit by the driver's helmet.
 •12 mm (0.5") thick. •Specification: SFI 45.1 or FIA 8857/2001 (pipe insulation or other foams not OK).
- ☐ 24. OTHER SIDE TUBES - T.2.16
 Cockpit design must prevent driver's neck from hitting bracing or other side tubes.
- ☐ 25. VEHICLE CONTROLS - T.3.7
 No hands, arms, or elbows outside side impact system when actuating controls.
 All controls, including shifter, must be inside cockpit.
- ☐ 26. LAP BELT FIT - T.4.4
 •Must pass over pelvis, not waist.
 •45-65° to horizon for upright driver, 60-80° for reclined.
- ☐ 27. SHOULDER HARNESS FIT - T.4.5
 Angle from shoulder between 10° up and 20° down (vs horiz).
- ☐ 28. SUB BELT FIT - T.4.6
 •Snug, holding latch in place.
 •Position in side-view: 5 Point: aligned with or forward of shoulder belt line; 6 Point: vertical or rearward of latch.
- ☐ 29. ARM RESTRAINTS FIT - VE.3.3.7
 Installed so the driver can release them and exit unassisted regardless of vehicle's position.
- ☐ 30. HEAD RESTRAINT FIT - T.4.7
 •Max 25 mm (1") forward gap to helmet.
 •Helmet contact point min 50 mm (2") from any edge.
 APPLIES TO ALL DRIVERS (may be adjusted for each driver)
- ☐ 31. MAIN HOOP & FRONT HOOP HEIGHTS - IN.5.1
 Helmet 50 mm (2.0") below lines between •top of front and main roll hoops, and •top of main hoop to rear attachment point of main hoop bracing. (Applies for every driver.)
- ☐ 32. DRIVER'S FOOT PROTECTION - T.2.2.2
 Feet must be rearward of the Front Bulkhead and no part of shoes or legs above or outside the Major Structure in side or front views when touching pedals.
 Remove nose bodywork if necessary for visual access.
- ☐ 33. EGRESS - IN.5.2
 5 seconds max to actuate cockpit master switch and exit to side of vehicle, from driving position, wearing safety equipment.
 Wings must remain fixed in position. (See egress worksheet.)

Driver Out

- ☐ 34. BODY & STYLING - T.1.1
 Open cockpit, formula style body. Four wheels, not in a line.
- ☐ 35. OPEN WHEEL - T.1.1.2
 •Top 180° of wheel/tire unobstructed from above.
 •Tires unobstructed from sides. •Vertical keepout zones 75mm in front & behind tires.
- ☐ 36. BODYWORK - T.9.1
 •No large openings (> ~6mm) in bodywork into driver compartment in front of or alongside driver.
 •Body/nose min 38 mm radius, +/-45° all directions.
- ☐ 37. WHEELBASE - T.1.2
 Minimum 1525 mm.
- ☐ 38. JACKING POINT - VE.2.1
 •Horizontal, lateral tube at the rear. •Orange color.
 •300 mm wide by 25-30 mm O.D. •Visible to person standing 1 meter behind car. •75 mm min ground clearance •Rear tires must come off the ground using Quick-Jack (lifts to 200 mm).
- ☐ 39. SEAT - T.3.3
 •Insulated against heat conduction, convection and radiation.
 •Lowest point no lower than bottom of side rails OR must have longitudinal 1.00" OD x 0.065" steel tube underneath.
- ☐ 40. FIREWALL - T.3.5
 Fire resistant material. •Must separate driver (line-of-sight up to mid-height of driver's helmet) from fuel, cooling, oil, and lithium battery systems. Wire/cable pass-throughs OK with grommets. Multiple panels OK w/ gaps sealed. •No gaps at sides or bottom.
- ☐ 41. FLOOR CLOSEOUT PANEL - T.3.4
 Non-perforated, non-brittle material from foot area to firewall. Multiple panels OK if gaps less than 3 mm (1/8").

Bodywork Off

- ☐ 42. DRIVER'S LEG PROTECTION - T.4.9
 Covers inside cockpit over sharp parts or moving suspension and steering components.
- ☐ 43. NON-CRUSHABLE OBJECTS - T.2.24
 Not allowed in the IA zone, unless accounted for in analysis (e.g. wing supports). 25 mm clearance aft of AI Plate.
- ☐ 44. THROTTLE PEDAL - IC.3.1.3
 Must have positive stop to prevent overstressing cable.
- ☐ 45. BRAKE PEDAL - T.5.1.10
 Made of steel, aluminum, or machined titanium (no welded Ti). Alt materials OK for pad face.
 Capable of 2000 N (tested only by organizers).
- ☐ 46. BRAKE PEDAL OVER TRAVEL SWITCH - T.5.2
 •Must cut ignition & fuel pump. •No re-start if brake released or actuated a second time. •Must NOT rely on software to work.
 •Not resettable by driver.
- ☐ 47. WHEELS - T.1.7
 •203 mm (8.0") min diameter. •Wheels with single wheel nut must have positive retainer. •Aluminum lug nuts hard-anodized and pristine condition.

Inspector Comments:

Driver Restraints

<input type="checkbox"/> 48. DRIVER RESTRAINT HARNESS - T.4.2 5, 6 or 7 point and be •labeled: SFI 16.1, 16.5, or FIA 8853/98, 8853/2016 •All lap belts must have Quick Adjusters. •Reclined drivers must have 6 or 7 point, and Quick Adjuster sub-belts OR 2 sets of sub belts. •Belts expire 2yr from mfr date or after expiration month (if SFI), or after year marked on label (if FIA).
<input type="checkbox"/> 49. HARNESS HARDWARE AND INSTALLATION - T.4.2 •Belts threaded through hardware per mfr instructions. •Hardware must be unmodified (no drilling, welding, etc).
<input type="checkbox"/> 50. HARNESS MOUNTS - T.4.3 •Belts must be protected by firewalls. •All belts attached securely to Primary Structure. •Tabs 1.6 mm (0.063") thick min, 60 mm ² shear area; tabs combining lap & sub belts 90 mm ² . Double-shear preferred. •Tabs welded on both sides; bolt-on tabs use minimum of two 1/4" dia Grade 5 bolts. •Tabs aligned with load direction of belt.
<input type="checkbox"/> 51. LAP BELT POSITION - T.4.4 •Pivoting mounting using eye bolt or shoulder bolt (no tube wrap). •Not re-directed by seat. •Belt centerline max 3" forward of seatback-seatbottom junction in side view.
<input type="checkbox"/> 52. SHOULDER HARNESS POSITION - T.4.5.4 Mounting points 178-229 mm (7"- 9") apart. Tube wrap OK.
<input type="checkbox"/> 53. SUB BELT POSITION - T.4.6 Sub belts cannot be re-directed by frame tubes or holes in seat.
<input type="checkbox"/> 54. BELT ATTACHMENT FASTENERS - T.4.4.8, T.4.5.6, T.4.6.3 •Lap & Shoulder 10 mm Grade 8.8 (3/8" SAE Grade 5), •Sub 8 mm (5/16") or as specified by harness manufacturer. •Pins required in clip-brackets •CRITICAL (positive locking) - T.10
<input type="checkbox"/> 55. HEAD RESTRAINT - T.4.7 •Min 150x150 mm (6"x6") AND height adjustment of 175 mm (7"); OR 150x280 mm (6"x11"). •38 mm (1.5") thick. •Near vertical. •Pad and mount must take 890 N (200 lb) force. •Energy absorbing material: SFI Standard 45.2 or FIA Tech List 17 (CONFOR pink).

General Inspection - Chassis

<input type="checkbox"/> 56. STEERING - T.1.6 •All steerable wheels must have positive stops to prevent linkage lock-up or contact with other parts. •7° max freeplay at the steering wheel. •NO STEER-BY-WIRE on front wheels. •No cables or belts. •No bonded joints in column without metal backup. •Rear steer limited to 6° total, with mechanical stops.
<input type="checkbox"/> 57. STEERING WHEEL - T.1.6 •Continuous perimeter, near round (no concave sections). •Driver operable quick disconnect. •Not higher than top of Front Hoop, in any angular position. •250 mm max rearward of Front Hoop (T.2.12.5).
<input type="checkbox"/> 58. CRITICAL FASTENERS, Steering - T.10 Steering wheel, column, rack mounting, tie rods.
<input type="checkbox"/> 59. SUSPENSION PICK-UP POINTS - GR.1.4 Inspected thoroughly for integrity: binding, over-articulation.

<input type="checkbox"/> 60. SUSPENSION - T.1.5 •Full suspension including front and rear damping. •Spherical rod ends and bearings: double-shear or safety washers.
<input type="checkbox"/> 61. MODIFIED LUG BOLTS/STUDS - T.1.7.3 Verify good engineering practices are followed e.g. no drill holes for mass reduction.
<input type="checkbox"/> 62. CRITICAL FASTENERS: SUSPENSION - T.10 Control arms, knuckle, spring load path, single wheel nuts. Exempt: lug nuts, multi-piece wheels, anti-roll bars, dampers. All fasteners must be tight (esp: jam nuts).
<input type="checkbox"/> 63. BRAKES - T.5.1 •Single pedal actuates all 4 wheels (one brake on limited slip OK) •Two separate hydraulic circuits w/ reservoirs; no brake-by-wire. •Protected by structure/shields from drivetrain & collisions. •No plastic brake lines. •No parts below chassis/tub in side view.
<input type="checkbox"/> 64. CRITICAL FASTENERS: BRAKES - T.10 •Pedal Assembly: including adjustment mechanism, caliper to knuckle mounts, rotor to hat. •Exempt: COTS caliper body assembly
<input type="checkbox"/> 65. BRAKE CONTROL SYSTEMS - GR.1.4 ABS, Traction, Yaw Control, etc: must have an approved FMEA.

Powertrain

<input type="checkbox"/> 66. ENGINE - IC.1.1 Four-stroke piston engine, 710 cc maximum swept displacement. No hybrids. Waste heat recovery allowed.
<input type="checkbox"/> 67. INTAKE and FUEL SYSTEM ROLL OVER PROTECTION - IC.1.2 •All parts of air intake system (including throttle body or carb, air intake ducting, air cleaner & air box), AND •all parts of the fuel storage, supply and fuel control systems (including fuel rail, throttle body or carburetor), must be within a surface defined by the top of the roll bar and the outside top edge of the tires.
<input type="checkbox"/> 68. AIR INTAKE SYSTEM - IC.2.2 & .3 •Side and Rear Impact protection if <350 mm above ground. •Supported if cantilevered (isolated to frame, rigid to engine). •CRITICAL FASTENERS: securely attached to block or head with brackets & mechanical fasteners w/ positive locking mechanisms. OEM-type rubber bushings not sufficient.
<input type="checkbox"/> 69. THROTTLE - IC.3 •Min qty of 2 springs at the TB, each capable of closing the throttle independently. TPS not acceptable as a return spring. •Cable must have smooth operation with no binding or sticking. •Cable position min 50 mm from any exhaust component.
<input type="checkbox"/> 70. RESTRICTOR - IC.2.4 •Must be circular: max dia 20.0 mm for gasoline and 19.0 mm for E85. •Cannot be movable or flexible. •Installed per below: NA: THROTTLE -> RESTRICTOR -> ENGINE FI: RESTRICTOR -> COMPRESSOR -> THROTTLE -> ENGINE
<input type="checkbox"/> 71. HIGH PRESSURE HYDRAULICS - T.8.2 Pumps and lines must have 1 mm thick steel or aluminum shields to protect driver and workers. (Brakes & clutch exempt.)

Inspector Comments:

Powertrain (Continued)

<input type="checkbox"/> 72. COMPRESSORS - IC.2.5
<ul style="list-style-type: none"> •Turbo or super chargers allowed if not OEM to engine. •Must be between restrictor and throttle. •Intercoolers downstream of throttle. •Carbs not allowed if compressors are used. •Compressor recirculation valves ok if downstream of restrictor. •No enlarged air chambers (section > 28 cm²) before throttle.
<input type="checkbox"/> 73. CATCH CANS - T.7.5
<ul style="list-style-type: none"> •Engine coolant (unless aircooled) and engine crankcase must have separate catch cans of 0.9 L min vol. •Oil(s) and water(s) must be separate. •100 °C-capable material. •Behind firewall, below shoulder level. •3 mm min diameter vent, directed away from driver. •PCV OK if routed to intake sys upstream of restrictor. •Cannot connect breathers to exhaust. •Trans, diff, other systems (unless sealed): 10% or 0.5 L catch can.
<input type="checkbox"/> 74. FLUID ACCUMULATION - T.7.4.5
Absorbent materials and open collection devices (regardless of material) are prohibited below the highest point of the exhaust system in compartments containing the engine, drivetrain, exhaust and fuel systems.
<input type="checkbox"/> 75. BELLYPANS - T.7.4.4
Must be vented to prevent accumulation of fuel, using 2 holes each min of 25mm dia.
<input type="checkbox"/> 76. FLUID LEAKS - T.7.4.1
Not permitted.
<input type="checkbox"/> 77. EXHAUST OUTLET - IC.7.2
<ul style="list-style-type: none"> •Outlet 45 cm (17.7") max behind rear axle centerline and 60 cm (23.6") max above the ground. •Located such that exhaust gases should not reach driver.
<input type="checkbox"/> 78. EXHAUST SYSTEM - IC.7.2
<ul style="list-style-type: none"> •Exhaust components outside bodywork forward of main hoop must be shielded from people approaching the car. •No fibrous wraps around exhaust tubes.
<input type="checkbox"/> 79. SCATTERSHIELDS GENERAL - T.7.2
<ul style="list-style-type: none"> •Required for clutches, chains, belts, CVT rotating parts, etc. •Not perforated. •End parallel to lowest part of front and rear sprockets. •Min 6mm fasteners •CRITICAL FASTENERS
<input type="checkbox"/> 80. SCATTERSHIELD MATERIALS - T.7.2
<ul style="list-style-type: none"> •Size: for chains: 2.7 mm (0.105") min thick steel, 3x chain width; for belts: 3 mm (0.12") min thick aluminum 6061-T6, 1.7x belt width. •OEM engine drive sprocket cover OK.
<input type="checkbox"/> 81. D'TRAIN FINGER GUARDS - T.7.2.8
Required to cover all drivetrain parts that spin while car is at rest. No holes >12 mm dia.
<input type="checkbox"/> 82. COMPRESSED GAS CYLINDERS - T.8
<ul style="list-style-type: none"> •Unmodified COTS cylinder (labeled). •Nonflammable gas. •Regulator on tank. •Securely mounted, axis not pointed at driver. •Rearward of Main Hoop within the frame envelope, or in structural sidepod; not in cockpit. •Insulated from exhaust. •Appropriate lines & fittings.
<input type="checkbox"/> 83. COOLANT - T.7.3
Only 100% water. NO ADDITIVES WHATSOEVER.

Electronic Throttle

<input type="checkbox"/> 84. ELECTRONIC THROTTLE CONTROLS - IC.4
ETC or "drive-by-wire" only permitted with pre-approval, requires special separate inspection.

Fuel System

<input type="checkbox"/> 85. FUEL TANKS - IC.5.3 & .4
<ul style="list-style-type: none"> •Must lie within major structure of the chassis, with side impact protection. •Rigid tanks cannot carry structural load & must be flexibly mounted. •Bladders or bags in rigid container. •No portion of fuel system below lower surface of frame. •Firewall between all parts of fuel system & driver.
<input type="checkbox"/> 86. FUEL LINES - IC.5.8
<ul style="list-style-type: none"> •No plastic lines between tank & engine (reinforced rubber hoses OK). •Bulbs/barbs on hose connections. •No worm-gear clamps. •Must be securely attached, •protected from rotating equipment & collision damage. •Systems >10 bar see IC.6.2
<input type="checkbox"/> 87. GOOD PRACTICES, fuel lines - GR.1.4
<ul style="list-style-type: none"> •Hoses and fittings must be type-matched (no clamps on braided metal hoses, etc). •Fuel lines restrained and protected from stress, heat, and abrasion.
<input type="checkbox"/> 88. FUEL FILLER NECK - IC.5.5
<ul style="list-style-type: none"> •Fuel-resistant materials, •min 35 mm inner dia, •within 30° of vertical. •Must prevent fuel spillage contacting driver, exhaust or ignition (add shields as needed). •Fueled w/o manipulating car in any way. •Cap secure and capable of withstanding pressurization (ie: threads or latch). •Easy access for common 2-gal jugs.
<input type="checkbox"/> 89. SIGHT TUBE - IC.5.5
<ul style="list-style-type: none"> •Fuel resistant materials, •transparent, •min 6mm inner dia. •Min 125 mm vertical height in area visible to fueler with vehicle fully assembled. •Sight tube must NOT run below top of tank. •Non-moveable fuel level line 12-25 mm below top of sight tube. (Clear filler neck OK as sight tube.)
<input type="checkbox"/> 90. FUEL RAIL - IC.6.1
<ul style="list-style-type: none"> •Securely attached to block, head or intake manifold with brackets & mechanical fasteners. •No plastic or composite fuel rails, except if unmodified OEM part. •CRITICAL FASTENERS
<input type="checkbox"/> 91. FUEL TYPE - IC.5.2
<ul style="list-style-type: none"> •Circle type: 93 octane gasoline 100 octane gasoline E-85 No agents other than the provided fuel and air may be induced into the combustion chamber. •Place appropriate fuel sticker adjacent to fuel filler.
<input type="checkbox"/> 92. FUEL VENTS - IC.5.7
<ul style="list-style-type: none"> •Must exit outside of the bodywork. •Must include a check valve to prevent leakage if car inverted.

Electrical

<input type="checkbox"/> 93. ON-BOARD STARTER - IC.8.1
Required (remote starters and push-starts prohibited).
<input type="checkbox"/> 94. PRIMARY MASTER SWITCH - IC.8.4.3
<ul style="list-style-type: none"> •On driver's right, near roll bar. •Access from outside of car. •Rotary type. •No relay. •Must kill ALL electrical systems. •Marked with international symbol. •Lever horizontal when ON.

Inspector Comments:

Electrical (Continued)

- ☐ 95. COCKPIT MASTER SWITCH - IC.8.4.4
•Pull-ON, Push-OFF type. •Alongside & unobstructed by steering wheel, easily reached by driver. •Must kill ignition & fuel pump(s). •Min dia 24 mm. •Marked with international symbol.
- ☐ 96. BATTERY - T.11.1
•Attached securely to frame or chassis. •Hot terminal insulated. •Wet-cells in marine box if inside cockpit. •Type must be identifiable. •Non-Pb requires overcurrent protection and firewall between driver. •No circuits > 60 VDC.

Aero

- ☐ 97. AERODYNAMIC DEVICES - T.9.2
•No powered ground effects. •Securely mounted - no oscillation or excessive movement. (Wings, undertray, splitter, endplates, vanes, etc.)
- ☐ 98. EDGE RADII - T.9.1
•Horizontal leading edges min 5 mm radius.
•Vertical forward-facing edges min 3 mm radius.
•Other edges: not sharp - GR.1.4
- ☐ 99. FRONT MOUNTED AERO - T.9.3
•Max forward: 700 mm ahead of the front tires.
•Max width: OUTSIDE of the front tires (at hub height).
•Max height: 250 mm if in front of tires (w/out driver).
- ☐ 100. REAR MOUNTED AERO - T.9.4
•Max rearward: 250 mm behind the rear tires.
•Max forward: Headrest support (undertrays exempt).
•Max width: INSIDE of the rear tires (at hub height).
•Max height: 1.2 m above ground (w/out driver).
- ☐ 101. AERO BETWEEN WHEEL CENTERLINES - T.9.5
•Max width: Line between front & rear tires (at hub height).
•Max height: 500 mm (exempt if w/in 400 mm of car centerline).

Primary Structure, Tube Frame

- ☐ 102. MAIN HOOP - T.2.11
•Must be steel with smooth bends with no wrinkles.
•Must be 1 piece & extend to lowest frame member.
•Tube endpoints 380 mm apart (inside dim) at bottom attachment. •Above Major Structure, max 10° to vertical.
•No part angled rearwards more than 10° from vertical.
•Bends above the SIS must be braced to a frame node.
- ☐ 103. FRONT HOOP - T.2.12
•Closed-section metal tube (may be multi-piece).
•Must extend to lowest frame member. •Max 20° to vertical.
- ☐ 104. FRONT BULKHEAD - T.2.19
Closed-section metal tube.
- ☐ 105. SIDE IMPACT STRUCTURE - T.2.26
•Min of 3 tubes must connect the main and front hoops. •Upper tube must be between 300 mm and 350 mm above the ground.
•Lower tube must connect endpoints of Main and Front hoops.
•At least one diagonal per side: must triangulate the upper and lower members between the Main and Front hoops.

- ☐ 106. SHOULDER HARNESS MOUNTING BAR - T.4.5
•Uncut, closed-section tube. •Attached to Main Hoop.
•Braced to Main Hoop if bent: braces 30° min to Main Hoop.
- ☐ 107. BENT OR MULTIPLE TUBES - T.2.8
•Min bend radius: 3x tube OD.
•A brace must connect from midpoint of bend to a frame node, •within 30° of plane of bend (Upper SIS, Shoulder Harness Bar exempt from 30°). •Brace material: same size as bent tube.
- ☐ 108. MAIN HOOP BRACING - T.2.13
•Must be steel w/ no bends. •One brace each side, attached within 160 mm of top of hoop. •Min 30° included angle with hoop. •Bracing must not be on same side of vertical as Main Hoop. •Must take load back to bottom of Main Hoop, and Upper Side-Impact tube, thru properly triangulated structure.
- ☐ 109. ATTACHMENTS TO BRACING - T.2.13.9
If any item which is outside the envelope of the Primary Structure is attached to the Main Hoop braces, then additional bracing must be added to prevent bending loads in the braces in any rollover attitude (e.g. suspension mounts, radiator).
- ☐ 110. FRONT HOOP BRACING - T.2.14
•Two forward facing braces, attached within 50 mm of top of hoop. •Forward of driver's shins in side-view. •Extra rearward bracing required if Front Hoop leans backwards more than 10°.
- ☐ 111. FRONT BULKHEAD SUPPORT - T.2.20
Min 3 tubes each side of car: •Bottom: connect bottoms of bulkhead and Front Hoop; •Top: connect within 50mm of top of bulkhead, 100 mm above and 50 mm below upper SIS tube (brace to Main Hoop if top tube does not connect near upper SIS); •Diagonal tube(s) to completely triangulate connections to upper and lower SIS tubes.
- ☐ 112. BOLTED JOINTS IN FRAME- T.2.15 & .17
•Edge of any bolt hole located > 1.5 x hole diameter from nearest edge of the material. •No blind or welded threaded fasteners. •Bolts 8 mm (5/16"), plates 2.0 mm (0.08"). (Primary structure joints only.) **CRITICAL FASTENERS**
- ☐ 113. REMOVABLE BRACING - T.2.18
•Double-shear (capped) or Sleeved Butt joints only. •No bends.
•No rod-ends.
- ☐ 114. TUBE MEASUREMENTS - T.2.2.7
Tech may use ultrasound to measure wall thickness and/or ask that 4 mm dia holes be drilled.
☐MRH ☐MHB ☐MHBS ☐FRH ☐FHB ☐FBH ☐FBHS
☐SIS ☐SHB ☐SHBB; If Required: ☐FBHS tubes above SIS
☐Other impact protection- list: _____

Critical Fasteners Reference: T.10

Note: For all locations marked "CRITICAL FASTENERS" in this form, the following requirements apply: •Material rating: SAE Gr 5, Metric 8.8, or AN/MS. •Hex-head or socket-head; no pan head, flat head, or low-profile screws. •Positive locking: safety wire, lock pins, or locking nuts with 2 threads visible beyond nut. Threadlock compounds not sufficient; no nylock nuts if >80 °C.

Inspector Comments:

Primary Structure, Monocoque

<input type="checkbox"/> 115. MAIN HOOP ATTACHMENT - T.2.35
•Three points per side at 30 kN each, or two 45 kN. •Mounting plates on hoop min 2 mm thick.
<input type="checkbox"/> 116. FRONT HOOP ATTACHMENT- T.2.36
•Three points per side: top, bottom and 300-350 mm. •May be fully encapsulated. •Must not be attached only by adhesive.
<input type="checkbox"/> 117. SIDE IMPACT PROTECTION - T.2.34
Construction extends to 350 mm above the ground.
<input type="checkbox"/> 118. HARNESS ATTACHMENT POINTS - T.2.41
•Test specimens: representative of vehicle construction. •Test loading direction: representative of harness installation.
<input type="checkbox"/> 119. LAMINATE TEST SPECIMENS - T.2.31
Two or more for both SIS and primary structure constructions: •Three-point bending: 275 x 500 mm •Perimeter shear: 100 x 100 mm •Identical to SES and vehicle
<input type="checkbox"/> 120. FRONT BULKHEAD & SUPPORT - T.2.33
Identical to SES
<input type="checkbox"/> 121. ATTACHMENT POINTS - T.2.40
•Two 8 mm bolts per joint. •One 10mm bolt on centerline allowed for hoop braces. •Backing plates: 2 mm steel. •No crushing of the core. •No blind or threaded inserts. •CRITICAL FASTENERS (positive locking)
<input type="checkbox"/> 122. IA ATTACHMENT, MONOCOQUE - T.2.38
Equivalent to: •Four 8 mm bolts for Impact Attenuator, •Eight 8 mm bolts for Anti Intrusion Plate
<input type="checkbox"/> 123. ANTI INTRUSION PLATE, MONOCOQUE - T.2.39
Physical Impact Attenuator Data test, or 3-point bending and perimeter shear tests

Impact Attenuator

<input type="checkbox"/> 124. STANDARD IMPACT ATTENUATOR - T.2.23
•Attached to AI Plate w/ four 8 mm (5/16") bolts and/or adhesive. May be horizontal or vertical. •Capable of taking vertical and transverse loads. •If Plate >25 mm wider than AI on any side: diagonal or X required in bulkhead, or testing to show AIP deforms <25 mm. •Foam must not be degraded or damaged.
<input type="checkbox"/> 125. IA TEST SPECIMEN - IN.8.1
•Identical to IA installed. Identical to Test Data Report. •Suitable failure mode (crushed element, not collapsed mount).

<input type="checkbox"/> 126. TEAM-DESIGNED IMPACT ATTENUATOR - T.2.23
•200 mm long x 200 mm wide x 100 mm high. •Attached to AIP w/ welds - 1:1 weld ratio, beads 25 mm min; or four 8 mm (5/16") bolts; or adhesive. •Must be capable of taking vertical and transverse loads. •Must be identical to test specimen.
<input type="checkbox"/> 127. ANTI-INTRUSION PLATE - T.2.22
•1.5 mm steel or 4 mm aluminum. •Attached to bulkhead w/ eight 8 mm (5/16") bolts (AIP extending outside of bulkhead tubes), or welded (AIP extending to centerline of bulkhead tubes). •Capable of taking vertical and transverse loads.
<input type="checkbox"/> 128. CRITICAL FASTENERS: ATTENUATOR - T.10
•IA: Four 8 mm bolts w/ positive locking •AI Plate: Eight 8 mm bolts w/ positive locking

Cockpit Templates

<input type="checkbox"/> 129. MAIN HOOP & FRONT HOOP HEIGHTS - T.2.10
Helmet of 95th percentile male (PERCY) to be 50 mm below the lines between top of front and main roll hoops and between top of main hoop to rear attachment point of main hoop bracing. Center of bottom circle placed minimum 915 mm from pedals.
<input type="checkbox"/> 130. COCKPIT OPENING - T.3.1
Template to pass from above cockpit to bottom of top SIS tube or 350 mm above ground if monocoque. Steering wheel & column, seat and padding can be removed; no removing firewall. Fore/aft translation of template OK.
<input type="checkbox"/> 131. COCKPIT INTERNAL CROSS SECTION - T.3.2
Template to pass from rearwards of the steering column to 100 mm rearwards of the pedals. Steering wheel may be removed; padding may be removed if removable with no tools & with driver in seat.

Overall

<input type="checkbox"/> 132. GOOD ENGINEERING PRACTICES - GR.1.4
•Proper use of fasteners. •Proper use of fluid lines and fittings. •Appropriate selection of materials regarding fluids, heat. •Protection from sharp edges - wiring, hoses, people. •Protection from heat - wiring, hoses, people. •Linkages not bound up or prone to over-articulation. •No excessive lash in joints and pivots.
<input type="checkbox"/> 133. VISIBLE ACCESS - IN.1.6
To all items on Tech Sheet without the use of mirrors, borescopes, etc.

Original Inspector Names:

Non-Compliance Comments:

Comment overflow sheet used? ☐ (See back of driver checklist)

FINAL APPROVAL BY INSPECTOR:

DATE:

2019 FSAE INSPECTION SHEET

CAR NUMBER:
SCHOOL:
ENGINE MODEL:
ENGINE BORE X STROKE:
ABS? YES/NO

IMPORTANT

THIS FORM MUST STAY WITH THE CAR UNTIL THESE PARTS OF INSPECTION HAVE BEEN COMPLETED

PART 2	
FUEL SYSTEM & TILT TABLE INSPECTION	
SPILLAGE - No fluid leaks of any kind permitted when car is tilted to 45 degrees in the direction most likely to create spillage; Fuel tanks must be filled to their sight tube fill line.	VEHICLE STABILITY - All wheels in contact with tilt table when tilted to 60 degrees to the horizontal.
FUEL STICKER - Fuel sticker in place adjacent to F/T filler. MARK TYPE OF FUEL USED (e.g. 93, 100 or E-85) ON THIS FORM	FUEL TYPE
NON-COMPLIANCE / COMMENTS:	
APPROVED BY:	DATE:

PART 3	
NOISE LEVEL & BRAKING PERFORMANCE INSPECTION	
NOISE LEVEL - 110 dB (C) ("C" scale) maximum during a static test, gearbox in neutral, UP TO a specified RPM (see Rule IN.10.4.1). 103 dBC at idle. Microphone level with the exhaust outlet(s), 0.5 m (19.7") from the outlet(s), at 45 degrees to the outlet. If multiple outlets, all to be checked. If movable tuning or throttling device, see IN.10.2.3.	BRAKING PERFORMANCE - Must lock-up all four wheels on dry asphalt at any speed.
MASTER SWITCH - Master switch on RHS of main roll hoop must cause engine to stop when actuated. (Perform at end of noise test)	
NOISE LEVEL:	ATTEMPTS:
NON-COMPLIANCE / COMMENTS:	
APPROVED BY:	DATE:

[illegible]

FORMULA SAE - DRIVER COCKPIT CHECKS

Car #	School Name:									
Driver's Name	Helmet Lines	Headrest: Fore-Aft	Headrest: To Edges	Lap Belt Position	Shoulder Belt Pos.	Sub Belt Position	Egress Time	Driver's License	Inspector Initials	Notes

Helmet Lines: 50 mm (2") min. below lines between Main & Front Hoops and between Main Hoop & rear attachment point of Main Hoop Bracing
 Head Restraint: Fore & aft: 25.4 mm (1 in) max gap to back of helmet.
 Head Restraint: To edges: Helmet contact point min 50 mm from any edge.
 Lap Belt: Over hip bones and tight. Arm restraints connected to latch.
 Shoulder Belts: Tight. 10° up thru 20° down (from shoulder, relative to horizontal).
 Sub Belts: Tight. Side-view position: 5-point: aligned with or forward of shoulder belt line, 6-point: vertical or rearward of latch.
 Egress: Max 5.0 sec from "go" to BOTH feet on ground. Must include actuation of cockpit master switch.

FORMULA SAE - DRIVER COCKPIT CHECKS

Car #	School Name:									
Driver's Name	Helmet Lines	Headrest: Fore-Aft	Headrest: To Edges	Lap Belt Position	Shoulder Belt Pos.	Sub Belt Position	Egress Time	Driver's License	Inspector Initials	Notes

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NON-COMPLIANCE / COMMENTS (CONT'D):

ITEMS ON THIS PAGE
COMPLETE AND APPROVED BY:DATE:

NON-COMPLIANCE / COMMENTS (CONT'D):

ITEMS ON THIS PAGE
COMPLETE AND APPROVED BY:DATE: