

2019 FORMULA HYBRID INSPECTION SHEET

CAR NUMBER:	
SCHOOL:	
SES APPROVED? YES/NO	
HYBRID, HIP OR ELECTRIC?:	
ENGINE MODEL:	NUMBER OF DRIVERS:
ENGINE CLASS: STOCK: MODIFIED:	TALLEST DRIVER: HEIGHT:

IMPORTANT

THIS FORM MUST STAY WITH THE CAR UNTIL THAT SPECIFIC PART OF INSPECTION HAS BEEN COMPLETED
PRESENT THE VEHICLE FOR INSPECTION IN THE FOLLOWING ORDER:

1. TECHNICAL INSPECTION
2. FUELING & TILT TABLE INSPECTION
3. NOISE LEVEL & BRAKING PERFORMANCE INSPECTION

NOTE - IF THERE IS A CONFLICT BETWEEN THIS FORM AND THE RULES, THE RULES PREVAIL

PART 1	
TECHNICAL INSPECTION	
TYRES & WHEELS	
DRY TIRES - Make: _____ Size: _____ Compound: _____	RAIN TIRES - Make: _____ Size: _____ Compound: _____
WHEELS - Four wheels not in a line, 20.32 cm (8.0 in) min. diam. Wheels with single wheel nut must have positive retainer.	RAIN TIRES - 3/32 in. min. tread depth moulded by tire manufacturer.
DRIVER'S EQUIPMENT	
HELMETS - Snell M2005, K2005, SA2005, M2010, K2010, SA2010, SAH2010, M2015, K2015, SA2015, SAH2015, EA2016, SFI 31.1/2005, FIA 8859-2015, 8860-2004, 8860-2010, 8860-2016, 8860-2018. No Open Face or Motocross.	DRIVERS' SUITS - 1 piece; SFI 3-2A/1 with fire resistant u/wear , SFI 3-2A/5, FIA 1986 or 2000 Standard, and LABELED AS SUCH.
FACE SHIELDS - made of impact resistant material. No goggles.	UNDERWEAR - Fire resistant or cotton. No synthetics.
SOCKS - Nomex, wool or cotton. No synthetics. No bare skin.	FIRE EXTINGUISHERS - Two (2) hand-held, 2.3 kg (5 lb.) minimum, dry chemical (minimum 3A-40BC extinguishers); 1 WITH CAR , 1 in paddock. (Must see BOTH at Tech.) On-board hand-held extinguisher NOT ALLOWED. SPECIAL HAZARD REQUIREMENTS - SEE RULES APPENDIX "I"
GLOVES / SHOES - Fire resistant material. No holes. No all-leather gloves.	
HAIR COVER - Fire resistant (Nomex or equivalent) balaclava or full helmet skirt REQUIRED FOR ALL DRIVERS.	
ARM RESTRAINTS - SFI 3.3 or equiv., installed so the driver can release and exit unassisted regardless of vehicle's position.	CHEMICAL SPILL KIT - Suitable for car. Show at Tech Inspn.
EXTERIOR, GENERAL	
PUSH BAR - With car, detachable, push & pull for 2 people standing erect behind car.	JACKING POINT - Must have an exposed tube at the rear perpendicular to the longitudinal axis approx. 30 cm (12 in) long by 2.5-2.9 cm (1-11/8 in) O.D. Painted orange. Visible to person standing 1 metre behind car.
BODY & STYLING - Open cockpit, formula style body. Keep-out zones, 75 mm in front to 75 mm behind tires.	TRANSPONDER - MYLAPS Car/Bike or AMB TranX 260 required. Securely mounted on RHS of car forward of Front Roll Hoop with clear view of ground.
WHEELBASE - Minimum 1524 mm (60 in)	TRANSPONDER FUNCTION - Signal received with wand.
CAR NUMBERS - On front & both sides of car, minimum 15.24 cm (6") tall, 20 mm (3/4") stroke & spacing, B on W, W on B only, specified background shapes. Must be clearly visible.	BODYWORK - Min. 38 mm (1.5 in.) radius on nose. No large openings in bodywork into driver compartment in front of or alongside driver, (except cockpit opening).
SCHOOL NAME & OTHER DECALS - School Name, or recognised initials - 5.1 cm (2") tall min. on both sides in Roman letters.	WING EDGES - Leading edges must be 12.7 mm (0.5 in) min. radius. ALL other edges, including Gurney flaps and exposed edges of u/trays, must be 3 mm (1/8 in.) min. radius.
CAMERA MOUNTS - Must be approved at Tech. If > 9oz, 2 attachment points, neither can be elastic or plastic. Watch mounting bolts to helmet clearance.	AERODYNAMICS - ALL aero devices, wings, u/trays, splitters, no further forward than 46 cms. (18") in front of front tires, no more rearward than rear of rear tires, no wider than outside edge of front tyres. No power ground effects.
TECH STICKER SPACE - 25cm x 20cm (10"x 8") on centerline of upper front nose of car.	
SAE & IEEE DECALS - SAE & IEEE logos front and/or both sides, prominent location.	

TECHNICAL INSPECTION (Cont'd)

PRIMARY STRUCTURE

STRUCTURAL EQUIVALENCY SPREADSHEET (SES) - Review for approval, check tubing sizes, & mountings for monocoques.	OTHER SIDE TUBES - Design prevents driver's neck hitting bracing or other side tubes
INSPECTION HOLES - 0.18" (4.5 mm) inspection holes req'd in non-critical areas of front & main hoops. Inspectors may ask for holes in other tube(s).	SIDE IMPACT PROTECTION - Min. of two (2) tubes + diagonal must connect the main and front hoops. Upper tube must be between 300 mm and 350 mm (11.8" and 13.8") above the ground. Lower tube can be lower frame member. At least one diagonal per side must connect the upper and lower members between the main and front hoops. All tubes to be 1.0" OD x 0.065" wall or 25.0 mm OD x 1.75 mm wall steel or equivalent. Monocoques require approved SES.
MAIN HOOP - MUST BE STEEL. 1.00" OD x 0.095" wall or 25.0 mm OD x 2.5 mm wall. Must be 1 piece & extend to lowest frame member. 380 mm (15 ins) apart (inside dim.) where attaches to the Major Structure. Above Major Structure, must be < 10 deg. to vertical & any bends braced. Smooth bends with no wrinkles.	ACCUMULATOR CONTAINER - Within rollover envelope, min. four 8mm (5/16") bolt attachment, mechanically robust & fire resistant material. Check vs SES.
MAIN HOOP BRACING - MUST BE STEEL. One brace each side, 1.00" x 0.065" or 25.0mm x 1.75mm min., attached within 16 cms (6.3") of top. Min. 30 deg. included angle with hoop. If main hoop is not vertical, bracing must not be on same side of vertical as main hoop. No bends. No rod-ends. Proper construction for removable braces (capping etc.) on BOTH ENDS. Must be triangulated back to lowest part of Main Hoop & to Upper SIS/Main Hoop node	FRONT BULKHEAD - 1.0" OD x 0.065" wall, steel tube or equiv. No non-crushable objects fwd of or 1" behind b'head.
SHOULDER HARNESS MOUNTING BAR/TUBE - 1.00" OD x 0.095" wall or 25.0 mm OD x 2.5 mm wall steel or equiv. Gussets or braces if not straight.	FRONT BULKHEAD SUPPORT - Support back to front roll hoop; 3 tubes per side, all 1.00" OD x 0.049" wall steel tube or equiv.. 1 bottom, 1 top within 50 mm (2") of top of bulkhead, 1 node-to-node diagonal (must form a triangle with Front BulkH'd and either top or bottom tube). (25.0 mm x 1.5 mm and 26.0 mm x 1.2 mm metric tubes OK)
FRONT HOOP- Must be closed section metal tube. 1.00" OD x 0.095" wall or 25.0 mm OD x 2.5 mm wall steel, or equiv. Can be multi-piece. Must extend down to lowest frame member. Max. 20 deg. to vertical. No lower than top of steering wheel. Max. 25 cms (10 ins) horizontal distance to steering wheel.	IMPACT ATTENUATOR - Impact Attenuator f'w'd of bulkhead, 200 mm (7.8") long x 200 mm (7.8") wide x 100 mm (3.9") high. Test piece, same as IA on car, must be shown. No wing supports thru' IA. Limits on use of standard FSAE IA.
FRONT HOOP BRACING - Two forward facing braces, 1.00" OD x 0.065" or 25.0 mm OD x 1.75 mm steel or equivalent, attached within 5 cm. (2 ins) of top. Extra rearward bracing required if Front Hoop leans backwards more than 10 deg.	IMPACT ATTENUATOR MOUNTING - All cars need anti-intrusion plate, 1.5 mm steel, 4 mm Al, or approved equiv.. Plate to FBH'd to be welded or min. eight 8mm (5/16") bolts. IA to plate attach, four 8mm (5/16") bolts or approved equiv.
MAIN HOOP & FRONT HOOP HEIGHTS - Helmet of 95th percentile male (PERCY) to be 50 mm (2.0 ins) 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, with Percy's hip point 91.5 mm (36") min. from rear face of pedals.	SEAT - Insulated against heat conduction, convection & radiation. Lowest point not below bottom of side rails OR must have longitudinal 1.00" OD x 0.065" steel tube
CONFORMS TO SES?	

STEERING, SUSPENSION, BRAKES

GROUND CLEARANCE - Enough to prevent any part of the car from touching ground during track events. 25 mm (1 inch) min. static clearance with heaviest driver.	STEERING - On at least two wheels with positive stops to prevent linkage lock up or tires contacting any part of the car. 7 degrees max. freeplay at the steering wheel. NO STEER-BY-WIRE on front wheels. Rear steer limited to + or - 3 deg. with mechanical stops.
SUSPENSION - Fully operational with dampers front and rear; 50mm (2.0 in) minimum wheel travel with driver in vehicle.	FASTENERS - Steering, braking, harness and suspension systems must use SAE Grade 5 or Metric Grade M8.8 or higher specs (AN/MS) with visible positive locking mechanisms, no Loctite or lock washers. Minimum of 2 exposed threads. Rod ends in single shear must be captured by a washer larger than the ball diameter. Adjustable rod ends must have jam nuts to prevent loosening. No button head, pan head, flat, countersunk or round head screws in cage structure, harness mount, steering, brakes or suspension.
SUSPENSION PICK-UP POINTS - Inspect thoroughly for integrity.	STEERING COLUMN - No bonded joints (must be mechanical & visible) strg wheel to rack.
BRAKES - Dual hydraulic system & reservoirs, working on all four wheels, (one brake on limited slip is OK). System must be protected by structure or shields from d/train failure or minor collisions. No plastic brake lines. No brake-by-wire. Regen with 1st 50% pedal travel OK. No parts below chassis in side view. Brake pedal steel or aluminum. Must take 2000N (450 lbs.f) on pedal W/O failure.	
STEERING WHEEL - Continuous perimeter, near round with driver operable quick disconnect. 25 cm (9.8 ins) max. from Front Hoop.	

CAR NUMBER:

SCHOOL:

PART 1, contd.

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TECHNICAL INSPECTION (Cont'd)

INTERIOR

<p>DRIVER RESTRAINT HARNESS -SFI 16.1, SFI 16.5 or FIA spec. 5, 6 or 7 point and be labeled. 50 mm (2") wide shoulder belts OK with HANS. 50 mm (2 in) wide lap belts are OK . All lap belts must have tilt-lock adjuster. Reclined drivers must have tilt-lock adjuster sub-belts or 2 sets of sub-belts installed. Dates: 2 years for SFI, 5 years for FIA.</p>	<p>DRIVER'S LEG PROTECTION - Covers inside cockpit over sharp parts or moving suspension and steering components.</p>
<p>HARNESS MOUNTS - No belts can pass through a firewall. (Belts must mount on driver's side of firewalls.) All belts attached securely to primary structure - 1.00" ODx0.065" steel tube min. Tabs 1.0"x0.063" thick min. Double shear preferred.</p>	<p>MAIN & FRONT HOOP HEIGHTS - Helmet of ALL DRIVERS min. of 50 mm (2.0 ins) below lines between top of front and main hoops and between top of main hoop to rear attachment point of main hoop bracing.</p>
<p>LAP BELT MOUNTING - Must pass over pelvic area at between 45 - 65 deg. to horiz for upright driver, 60-80 deg. for reclined driver. Pivoting mntg with eye bolts or shoulder bolts (min. 3/8" or 10 mm) attached securely to Primary Structure</p>	<p>HEAD RESTRAINT - Min. 1.5" thick & 6" wide. 11" min. tall OR 36 sq.ins min. with 7" vert. adjust. SFI 45.2 or Pink CONFOR CF-42 foam padding. Near vertical. Must take 200 lbs.f load. Check location with all drivers.</p>
<p>SHOULDER HARNESS MOUNTING - Mntg points 7"- 9" apart. Angle from shoulder betwn 10 deg. up and 20 deg. down to horizntl. Attach to Primary Structure. No bending loads into Main Hoop Bracing W/O extra bracing. Bolts 3/8" or 10mm min.</p>	<p>ROLL BAR PADDING - Rollbar or bracing that could be hit by driver's helmet must be covered with 12.7 mm (0.5 in) thick, SFI or FIA (hard) padding. Pipe insulation or foam not OK.</p>
<p>FIREWALL - Rigid, fire resistant material. Must separate driver (line-of-sight upto mid-height of helmet) from fuel, cooling, oil systems & accumulators. Wire/cable pass-throughs OK with grommets. See diagrams for req'd coverage.</p>	<p>VISIBILITY - 100 deg. min. field either side. Head rotation OK or mirrors. If mirrors, must be firmly installed and adjusted.</p>
<p>FLOOR CLOSEOUT PANEL - Req'd from foot area to firewall; solid, non-brittle material; multiple panels OK if gaps < 3 mm</p>	<p>VEHICLE CONTROLS - All controls, incl. shifter, inside cockpit. No hands, arms, elbows O/S SIS to actuate.</p>
	<p>DRIVER'S FOOT PROTECTION - Feet must be rearward of the Front Bulkhead and no part of shoes above or outside the Major Structure in side or front views when touching</p>
	<p>EMERGENCY SHUT DOWN - Must operate Cockpit BRB, blindfold < 1 sec. ALL DRIVERS</p>
	<p>EGRESS - 5 secs max. to exit car from seated position with helmet, gloves, arm restraints, belts. ALL DRIVERS.</p>

ENGINE COMPARTMENT

<p>ENGINE - Four cycle piston engine, maximum swept displacement 250 cc SI (gas)</p>	<p>FUEL RAIL - Securely attached to block, head or int. manifold with brackets & mechanical fasteners.</p>
<p>COMPRESSORS - Turbo or super chargers allowed but moves engine to "Modified" category. Turbo/supercharger must be between restrictor and engine.</p>	<p>EXHAUST OUTLET - Outlet 45 cm (17.7") max. behind rear axle centerline and 60 cm (23.6") max. above the ground.</p>
<p>AIR INTAKE SYSTEM ROLL OVER PROTECTION - All parts of the engine air and fuel control systems, (including throttle body or carburetor, air intake ducting, air cleaner & air box), must lie within a surface defined by the top of the roll bar and the <u>outside top edge of the tires</u>.</p>	<p>EXHAUST SHIELDING - Exhaust components outside the body forward of main hoop must be shielded from people approaching the car. No fibrous wrap on exhaust.</p>
<p>AIR INTAKE SYSTEM - Any portion less than 350 mm (13.8") above ground must have Side Impact protection to Rule IC1.5.2.</p>	<p>SCATTERSHIELDS - Req'd for clutches, chains, belts, etc. No holes. 6mm M8.8 or 1/4" diam Grade 5 fasteners min. <u>Down to lowest point of both chain wheels/pulleys.</u></p>
<p>AIR BOXES - Large air boxes must be securely mounted to frame or engine with flexible connection to throttle.</p>	<p>SCATTERSHIELD MATERIALS-For chains, 2.7mm (0.105") min. thick STEEL, 3 x chain width. For belts, 3mm (0.120") min. thick aluminum 6061-T6, 1.7 x belt width.</p>
<p>THROTTLE PEDAL - Must have + stop to prevent overstressing cable. Design so driver's foot can't kink/bend cable.</p>	<p>CATCH TANKS - Any IC engine coolant overflow, crankcase breather or lube system vents must have separate catch tanks. One quart minimum each. 100 deg. C mat'l. Behind firewall, below shoulder level. 3 mm min. dia. vent away from driver. Other liquid lube systems, 10% of capacity or 0.5 L.</p>
<p>THROTTLE, Mechanical - Cable must be at least 50.8 mm (2") from any exhaust component; must have smooth operation with no binding or sticking; must have minimum of 2 springs at the TB, each capable of closing the throttle independently. TPS not acceptable as a return spring. Shields for anti-jamming of gears, etc.</p>	<p>TRACTIVE SYSTEM- Rollover, side & rear impact protection.</p>
<p>THROTTLE, ELECTRICAL - Fail safe design. Commercial system recommended. Appendix from Design Report shown at Tech.</p>	<p>COOLANT - Only water. Can apply for pre-approved variance for cooling electronics. (Opticool OK for electronics.)</p>
<p>RESTRICTOR - Must be circular; max. diam. 12.9 mm (0.508 in) for gasoline fueled cars and 12.3 mm (0.483 in) for E85 fueled cars. Cannot be movable. Not required for "Stock" SI.</p>	<p>FLUID LEAKS - Oil, coolant, fuel - none permitted.</p>
<p>INTAKE MANIFOLD - Securely attached to block or head with brackets & mechanical fasteners. OEM type rubber bushings acceptable ONLY if complete system is used.</p>	<p>ON-BOARD STARTER - Required</p>
	<p>GAS CYLINDERS - Proprietary manufacture & labeled, nonflammable gas, regulator on tank, securely mounted within the Major Structure, but not in cockpit, axis not pointed at driver, insulated from exhaust, appropriate lines & fittings. Protected from failure of rotating equipment.</p>
	<p>VISIBLE ACCESS - To all items on Tech Sheet</p>

TECHNICAL INSPECTION (Cont'd)

FUEL SYSTEM

<p>FUEL SYSTEM ROLL OVER PROTECTION - All parts of the fuel storage, supply and fuel control systems, (including fuel rail, throttle body or carburetor), must lie within a surface defined by the top of the roll bar and the outside top edge of the tires.</p>	<p>FUEL FILLER NECK - Min. diam 38 mm (1.5"). Max. 45 deg. from vertical. Transparent sight tube optional but any sight tube must NOT run below top of tank. Clear filler tube allowed. Must prevent refueling spillage contacting driver, exhaust or ignition parts.</p>
<p>FUEL TANKS - Must lie within major structure of the chassis with full side & rear impact protection & firewall between fuel supply & driver. Must have a drain at lowest part of tank with provision to safety wire the plug. Plug must not be below the lowest plane of the frame.</p>	<p>FUEL VENTS - F/tank & carb vents designed for no spillage on hard cornering or accels. Must exit outside of the bodywork, and have a check valve to prevent leakage if car inverted.</p>
<p>BELLYPANS - Must be vented to prevent accumulation of fuel.</p>	<p>FUEL TYPE - 93 octane gasoline, E-85 (Mark down type)</p>
<p>FUEL LINES - No plastic lines between f/tank & engine. Fuel injection systems must use metal braided hose with threaded fittings, or reinforced rubber hose & approved clamps (no aircraft clamps) & annular bulbs or barbs. Must be securely attached and protected from possible rotating equipmnt or collision failure.</p>	<p>FUEL STICKER - Appropriate sticker applied adjacent to fuel filler.</p>

ELECTRICAL - CHECKS W/O TURNING ON ELECTRICS

<p>MASTER SWITCHES, LOCATION - Two, both on RHS at driver's shoulder level, behind cockpit, access from outside car. Rotary, removable red key, labeled, horizontal "on" position. GLVMS to cut ALL electrical (multi-pole switch with alternator etc.). TSMS to open shutdown circuit.</p>	<p>BRAKE PEDAL O/TRAVEL SWITCH - Must be flip or push-pull; shut down engine, f/pump & shut-down system. No re-start if released or actuated 2nd time. Not re-setable by driver. Must NOT rely on programming to work. Cannot be pedal stop.</p>
<p>SHUTDOWN BUTTONS, LOCATION - Red, push-pull or push & turn, all trip s/down circuit. Two, 1 each side, 40mm diam., b'hind driver head. One on IP, 24mm diam., in easy reach & resettable by driver.</p>	<p>BRAKE LIGHT - RED, rectangle, triangle or near round, min. 15 sq. cms., clearly visible from the rear; on veh. centerline; height 'tween wheel centerline & driver's shoulders. LED w/o diffuser, > 150 mm long, < 20 mm spacing.</p>
<p>WARNING STROBE LIGHT, LOCATION - Mounted at top of Main Hoop but within rollover envelope. Visible 360 deg. Must not contact helmet.</p>	<p>LOW VOLTAGE BATTERY - Attached securely to frame or chassis; hot terminal insulated; wet-cells in marine box if inside cockpit.</p>

COCKPIT TEMPLATES

<p>COCKPIT OPENING - Fig 14 template passes down from above cockpit rim to below top SIS tube (or to 350 mm above ground for monocoques). Strg wheel, strg column, seat & padding can be removed. No moving or removing firewall.</p>	<p>COCKPIT INTERNAL CROSS SECTION - Fig. 15 template to pass in cockpit from rearward of steering column to 100 mm rear of pedals. Strg wheel and padding removable with no tools & driver-in can be removed.</p>
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NON-COMPLIANCE / COMMENTS:

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2019 FORMULA HYBRID 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	
FUEL SPILLAGE - No fuel spill permitted when car is tilted to 45 degrees in the direction most likely to create spillage; Tanks to be filled with lesser of 3.7L or to 50 mm from top of filler neck.	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, E-85) ON THIS FORM	FUEL TYPE
NON-COMPLIANCE / COMMENTS: <hr style="border-top: 1px dotted black;"/> <hr style="border-top: 1px dotted black;"/> <hr style="border-top: 1px dotted black;"/>	
APPROVED BY:	DATE:

PART 3	
NOISE LEVEL, MASTER SWITCHES & BRAKING PERFORMANCE INSPECTION	
NOISE LEVEL - 110 dB (A) ("A" scale) max. during a static test, g/box in neutral, engine at specified rpm (see Rule IC.3.2). Microphone level with the exhaust outlet(s), 0.5 m (19.7") from the outlet(s), at 45 degrees to the outlet. If >1 outlet, check all.	BRAKING PERFORMANCE - Must lock-up all four wheels on dry asphalt at any speed. If adjustments are made to the vehicle after three failed attempts before retest, the car may run on the Practice Track without the final Brake Performance Tech Sticker.
READY-TO-DRIVE SOUND - Min. 80 dBA, check at front and both sides at 2 metres radius from emitter.	BRAKE LIGHT - Works.
MASTER SWITCHES - Master switches must cause engine to stop from higher rpm. (Perform at end of noise test). Check both BRB's, IP button & GLVMS (Note: brake light must also go off with GLVMS).	ATTEMPTS:
NOISE LEVEL:	ATTEMPTS:
NON-COMPLIANCE / COMMENTS: <hr style="border-top: 1px dotted black;"/> <hr style="border-top: 1px dotted black;"/> <hr style="border-top: 1px dotted black;"/>	
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