2016 BAJA SAE Technical Inspection Sheet

Competition: _____

School: _____

1	DRIVER	5	DRIVER	9	DRIVER
2	DRIVER	6	DRIVER	10	DRIVER
3	DRIVER	7	DRIVER	11	DRIVER
4	DRIVER	8	DRIVER	12	DRIVER

Vehicle # | | | |

Transponder 1 |

Transponder 2 |

Front Tires				Rear Tires				Gear Ratio	CVT Primary Weight	CVT Primary Spring Color	CVT Secondary Spring Color
Size	Dia.	Wd.	Rim	Size	Dia.	Wd.	Rim	Total After CVT	Grams	Color or unique marks	Color or unique marks
Make				Make							
Model				Model							

Instructions:
1) Inspect your car completely before coming to tech inspection and initial each item under "Team" on the tech sheets. Once complete, the faculty advisor will sign this form. Each unique car shall have its own set of forms for each competition.
2) Fill out the remainder of this form with all drivers names, transponder numbers, tire, wheel, and drivetrain configuration, and sign and date the form.
3) This form and inspection sheets shall be presented to the technical inspectors with the vehicle.
4) Vehicles are to arrive at technical inspection ready to run, **with all documentation, all safety equipment, and all drivers present**.

NTI Use Only			
In		Tech Num.	
Out			
In		Tech Num.	
Out			
In		Tech Num.	
Out			

Faculty Advisor: Signature and Date _____

Team Captain: Signature and Date _____

Technical Inspector: _____

C2.6 - "As Approved" Condition
This form will be used to certify at any time that a vehicle has the original components presented at technical inspection. *Any vehicle found to have a tire/wheel and/or drivetrain configuration not matching this form shall receive a 75 point penalty for each time they are found in violation.*

Section	Rule	Team	TI	Failed Items	RC
Design Constraints					
B1.1	The vehicle must have four (4) or more wheels not in a straight line				
B1.1.2	Max width 1626mm (64in) with wheels pointing forward				
B2.5.15	Hybrid electric power systems are specifically prohibited.				
B2.5.16	Energy storage devices used for propulsion, other than hydraulic accumulators, are specifically prohibited.				
B3.2.3	Any electronic control device must be powered by a Briggs engine alternator				
Roll Cage - Material & Documentation					
B8.3.13	Roll cage specification sheet must be present and filled out.				
B8.3.12	Calculations, purchase invoices AND material certifications of the materials used in the roll cage and bracing are required at technical inspection.				
B8.3.12	Check thickness of roll cage in a minimum of two places. (1.57mm or 0.062 in minimum)				
B8.3.12A	Primary roll cage members must be constructed of steel tubing with a minimum carbon content of 0.18%., OD of 25.4mm (1.0in), wall thickness of 3.0mm (0.120in).				
B8.3.12B	Alternative Material must have equivalent stiffness (EI) and bending strength (SyI/c) min thickness 1.57 mm (0.062in); calculations must be in SI units.				
B8.3.1	LDB, SIM, FAB, USM, RLC, all crossmembers constructed of secondary roll cage material, and any tube used to mount the safety belts must be a minimum 25.4mm (1.0in) OD and 0.89mm (0.035in) thick.				
B8.3.11	One destructive testing (sample #1) and one destructive inspection (sample #2) weld sample for each process performed by each roll cage welder is required at technical inspection.				
B8.3.11	Weld samples are constructed of the same material and with the same process(es) as the inspected vehicle.				
B8.3.11	Weld samples exhibit superior weld strength with respect to the base material.				
B8.3.11	Weld samples exhibit sufficient and substantially uniform weld penetration.				

Section	Rule	Team	TI	Failed Items	RC
Roll Cage - Geometry (Section 1)					
B8.3.1.1	All roll cage members having a bend radius of > 152mm (6in) may not be longer than 711mm (28in) unsupported. The minor angle between the two ends of a non-straight tube must not exceed 30°.				
B8.3.2	Lateral Crossmembers (LC) must be straight, with a minimum length of 203.5mm (8in)				
B8.3.3	RRH can have a maximum of 4 sections, no break vertical members, driver seat cannot intrude RRH plane.				
B8.3.3	Rear Roll Hoop (RRH) must be substantially vertical (+/- 20 degrees from vertical).				
B8.3.3.1	RRH braced in the lateral direction (max 127mm (5in) from top and 127mm (5in) from bottom of roll cage). The angle between the RRH and LBD ≥ 20 degrees.				
B8.3.4	Front two points (C) shall be joined by a lateral cross member. (LC)				
B8.3.8	Front bracing (FBM) max of 45 degrees between vertical and FBMup.				
B8.3.8	FBMUP joins points C to D. FBMLOW joins points F to D.				
B8.3.5	Lower Frame Side members must extend from RRH to points forward of driver's heels which are connected by the FLC (and ELC for nose cars).				
B8.3.8.1	If the RHO and FBMUP are not made of a continuous tube, a gusset is req'd at point C.				
B10.2.3	Tubes anchoring safety harness shoulder straps shall be mounted to the primary welded structure of the vehicle and within the plane of the RRH.				

Section	Rule	Team	TI	Failed Items	RC
Roll Cage - Geometry (Section 2)					
B8.3.9	Members in the FAB system must not exceed 1016mm (40in) in unsupported length.				
B8.3.9	Projected to side view, roll hoop bracing triangulation angles must be at least 20°.				
B8.3.9.1	If front roll hoop bracing is used, it must connect FBMup, LFS, and SIM <5" from C				
B8.3.9.2	If rear bracing is used, there must be a structural triangle connecting point B to either point A or S. The aft vertex of the structural triangle must also be connected to whichever point A or S is not part of the structural triangle (this member is exempt from the maximum 30 degree bend rule). The aft vertices must be joined by an LC.				
B8.3.4 B8.3.3	RHO must be >1041mm (41in) above driver seat; LC at point C must be >305mm (12in) forward of seat back; and RRH must be >737mm (29in) wide at 686mm (27in) above seat. All dimensions are with respect to the template in RC5.				
B8.3.6	The side impact members shall run between 203mm (8in) and 356mm (14in) above the lowest point of the seat in contact with the driver.				
B8.3.7	The USM shall pass directly below the driver where the template contacts the seat bottom.				
B8.3.10.4	All butt joints are reinforced with an internal sleeve and exhibit at least 101.6mm (4in) linear distance of weld bead.				
B8.5.1	Bolted roll cage meets specifications. No pin joints.				
Roll Cage - Driver Clearance					
B8.2 B8.2.1	The roll cage is large enough for the largest driver. The driver's helmet will be at least 152mm (6in) away from a straight-edge applied to any two places on the structure.				
B8.2	The driver's torso, knees, shoulders, elbows, hands, and arms must have 76mm (3in) of clearance to the outside structure of the cockpit, less the roll cage padding.				
B8.2.1	The driver’s feet must be completely within the roll cage.				
B8.3.6	If the tube between the front LC connecting the two SIM members (points SF, L and R) is below the driver's toes, an additional bar will be needed above the driver's toes.				
A3.8	The roll cage PROTECTS the driver as intended. No tubes showing any cracks or deformation. Final judgment will rest with National Technical Inspectors.				

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Driver Restraint					
B10.1.1 B10.1	Minimum 5-point harness with 3-inch webbing and single metal-to-metal quick release lever buckle. No cam lock systems.				
B10.1.2	All driver restraint systems must meet either SFI Specification 16.5/16.1, or FIA specification 8853/98. No older than 3 years as of Jan 1st of competition year.				
B10.2.3	The shoulder harness must be securely mounted to the primary welded structure of the vehicle and within the plane of the RRH.				
B10.2.3	Shoulder belts must be looped around a straight frame tube meeting secondary member requirements and have something designed to limit lateral belt movement.				
B10.2.3	The belts may go through the firewall as long as additional firewall material is added to protect that portion of the belt.				
B10.2.2	The mounting points shall be 203mm ± 25.4mm (8in ± 1in) center to center of the mounting bolts and not pass through anything that will cause the center distance to not be 203mm ± 25.4mm (8in ± 1in), including any type of seat.				
B10.4.1 B10.4.1.2	Anti-submarine belt tabs must be bolted to the frame in double shear or wrapped around a tube. Webbing redirections over 30 degrees are unacceptable. Webbing must not significantly twist between mounting point and latches.				
B10.3.2	Frame tabs for mounting the lap and anti-submarine belts must be no less than 2.29mm (0.090 in) thick, must have at least 38.1mm (1.5in) of weld length per tab, bear no holes other than those required for bolts, and not display significant deformation when pulled on. Fastener and tab hole diameters must be the same.				
B10.3.1	Lap belt tabs must be in double shear, free to pivot and align with the direction of the load. Webbing may not be routed against the seat as to greatly change the direction of the load.				
B10.8	Head restraint must be mechanically fastened (NO Velcro or adhesive) to the vehicle. Head restraints may also be mechanically fastened or integral to the driver's seat.				
B14	ALL fasteners in the **driver restraint** system be: 1) Captive 2) Meet or Exceed SAE Grade 5 specifications 3) Have at least two threads exposed past the nut.				
B14.5	ANY socket-head cap screws in the **driver restraint system** shall meet requirements of B14.5.				
B14.6	ANY unmarked or any student-manufactured fastener in the **driver restraint system** shall meet requirements of B14.6.				

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Seat					
B10.7.4	**Suspension Seat Only**: Seat Back mounting points on RHO not more than 4 inches away from plane of RRH.				
B10.7.4	**Suspension Seat Only**: Seat Bottom mounting points are within 2 inches of a frame node.				
B10.7.4	**Suspension Seat Only**: Bracing tube diameter is no less than 0.5 inches, 0.049 inches wall thickness, and routed to frame nodes. Smaller dimensions will not be accepted.				
B10.7.1	**Suspension Seat Only**: Constructed of durable, resilient, woven material. Adequate and neat stitching.				
B10.7.3	All Seats: Two or more seat back mounts, four or more seat bottom mounts. Tabs shall meet seat belt tab requirements. Any mounting tubes shall at least meet secondary member requirements.				
B10.7.2	All Seats: Seat back plane not further forward than vertical, and no more rearward than 65 degrees from vertical.				
B10.7.1	Conventional Seat: Generally rigid and of metal or composite construction. (No plastic)				
B10.7	Seat works in concert with the safety harness to secure driver.				

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	Fuel System				
B12.1	Entire fuel system, including tank and carburetor assembly is contained within the roll cage. Test with straight edge between two points on the frame.				
B12.3.1	Fuel pumps are prohibited.				
B12.1	Fuel tank must be mounted to OEM mounts with OEM fasteners OR directly to the roll cage via secondary members. No cantilever mounts. Mount spacing shall be similar to the spacing of OEM fuel tank mounts. All fasteners must meet rule B14.				
B12.1	Remote mount fuel tank mounting tabs less than 50.8 mm (2 in. hole ctr to tube edge)				
B12.2.4	Any cover or lid over the fuel tank shall utilize rubber draw latches or over-center latches, easily actuated by track workers with gloves on.				
B12.2	Removable fuel tank meets all guidelines as specified in the rules. (B12.2.x)				
B12.3.1	Only one, unmodified, stock Briggs & Stratton tank is permitted.				
B12.3.2	Tank has standard B&S gas cap (#B4325GS) with a built in check valve.				
B12.4 ***B12.5***	All fuel lines must be SAE fuel rated, 1/2in OD and 1/4in ID, located away from sharp edges, hot exhaust parts, and prevented from chafing with grommets or other means.				
B12.6	Fuel tank position must be such that no fuel can spill onto the driver, engine, ignition, or exhaust during fueling.				
B12.6	Drip pan is at least 203mm (8in) in diameter or equivalent area and have sides of at least 38.1mm (1.5in) above top edge of the fuel tank.				
B12.6.1	Drip pans must be graded or inclined such that all spilled fuel drains from the drip pan – fuel must not pool anywhere in the pan.				
B12.6.1	Drip pans must be mounted using sound engineering practices. Mounting the drip pan and/or splash shield(s) directly to the fuel tank with a connection only around the fuel cap is insufficient.				
B12.6.2	The fuel must drain from the drip pan through a tube, min ID of 12.7mm (0.5in), to the bottom of the car. Matching fittings must have a min ID of 9mm (0.375in)				
B12.6.2	Drain line must be robust and *mechanically fastened* to the drip pan with a threaded connection or hose barbs. No adhesive allowed.				
B12.6.3	Drain constructed of materials appropriate for fuel such as metal tube and fittings and rubber line **rated for fuel**. Check for leaks at all connections.				
B12.7	Splash shields are required to prevent fuel from accidentally being poured directly on the engine or exhaust while refueling or preparing to refuel the car.				
B12.7.1	Splash shields shall not be adjustable and must remain effective at all times.				

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Guards					
B15.1	All belts, chains, sprockets, etc. must have shields adequate to prevent injury from flying components.				
B15.1	Shields must extend around the periphery of all rotating parts and be wider than the component they are guarding.				
B15.1	Material shall be 1010 steel plate or better at least 1.524 mm (0.060 in) thick or 6061-T6 aluminum or better at least 3.0 mm (0.12 in) thick. All other material are prohibited. Aluminum and composites in use as general cover construction is permitted.				
B15.1	Driveshafts moving faster than the drive axles may use a securely mounted driveshaft loop.				
B15.3	Factory stock guards must be demonstrated to be equal to those described in this section. (Unmodified Polaris CVT covers are allowed, but finger guarding needs to be applied over vent).				
B15.2	All moving powertrain parts must be guarded **on all sides** so that a finger cannot be inserted into them. U-Joints, axle shafts, brake rotors and hubs are exempt. Polaris CVT covers are subject to finger guard requirements. Non rigid, fabric coverings such as “Frogskin”, Ceconite, and neoprene are unacceptable.				

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	Cockpit				
B9.3	A firewall must completely separate the engine compartment and fuel tank from the cockpit. Shall cover entire plane of RRH.				
B9.4	This firewall must be metal, and at least 0.508mm (0.020 in) thick.				
B9.5	Cutouts and multiple firewall panels are allowed , if no fuel may enter the cockpit.				
B9.7	Body panels must cover the area between LFS member and SIM. The material must be plastic, fiberglass, metal or similar material. No gaps can exist that are larger than 6.35 mm (0.25 in). Velcro and / or Zip ties are **not** acceptable fastening methods.				
B9.9	Steering and suspension links protected from driver intrusion and entanglement.				
B9.9	Open/exposed universal joints in steering system near drivers feet shall be covered and/or booted to prevent entanglement.				
B9.8	Belly pan must extend the entire length of the cockpit and protect driver.				
B9.8	Belly pan material must be metal, fiberglass, plastic, or similar material. They must be designed to prevent debris and foreign object intrusion into the driver compartment. Expanded metal, fabric, or perforated panels are not allowed.				
B9.13	Only foot operated throttle controls are allowed. Wide open throttle stop is required (at the pedal). Hydraulic throttle controls are specifically prohibited.				
B9.13	All throttle controls must return to idle stop in the event of failure and ensure full throttle is achievable. Throttle cable cannot be bare from the forward mounting point to the firewall.				
B9.11	Fire extinguisher must be mounted on the right side of the driver, easily accessible, with the top below the driver's head, and the top half above the SIM. Mounting bolts must meet B14. Radial clearance to the pull knob shall be 2.5 inches per figure 7. All mounting bolts shall be appropriate for the required mounting hole geometry.				
B9.11	Extinguisher mount tabs are at least 0.125 inch thick. Mount uses at least 2 bolts.				
B9.11	Mount must resist shaking loose, but the extinguisher must be easily removable.				
B9.10	Two identical extinguishers with a Minimum UL rating of 5 B C; must be equipped with a **manufacturer installed dial gauge**; gauge must be **readable and properly charged**.				
B9.10	Fire extinguisher mount is Drake FIREX-MNT-DOR. No other mounts are acceptable.				
B9.10	All extinguishers must be labeled with school name and car number.				
B8.4	All sharp edges which might endanger the driver, crew, or officials must be eliminated, shielded or radiused. All cable ties shall be flush cut and sheet metal edges deburred.				

Section	Rule	Team	TI	Failed Items	RC
Electrical					
B3.4.1	Unmodified, Baja SAE approved brake lights only. Polaris 2411450, Polaris 2411099, Polaris 2411092-432, Haul Master 93263, Command 003-6018R, Command 003-6016				
B3.4	It must be minimum 1000mm (39.4in) from ground, and clearly visible in daylight when on. Light shall be completely extinguished when brakes are not actuated.				
B3.5	Each independent brake circuit must be equipped with a hydraulic pressure switch. Actuation of any one circuit or combination of any circuits shall turn the brake light on.				
B3.6	Cars with reverse must have reverse light (SAE "R") of LED design and alarm mounted at min 700mm (27.6in) from the ground and aft of the RRH/firewall.				
B3.3	Each vehicle must be equipped with two (2) easily accessible kill switches turning off the ignition. The Kill switch must not de-energize the Brake Light(s). (Note: Kill switches do not need to cut power to other electronics.)				
B3.3.1	Kill switch is a: Ski-Doo 01-171, 27-0124, 27-0152, or Polaris 4110106				
B3.3.2	One switch must be located on the driver's right side of the vehicle, on a panel perpendicular (+/- 15deg) to the firewall, no more than 178mm (7in) from the top of the roll cage.				
B3.3.3	Kill switch wiring must be sealed, protected or securely attached to the frame to prevent the wires from being entangled with the driver or obstacles.				
B3.1	Reverse and brake lights shall remain effective at all times. No cut-out or disabling switches are permitted.				
B3.2.1 B3.2.2.3	The batteries must be sealed and not leak in the event of a roll over. The mounting must prevent the battery from coming loose during a roll over. Terminals shall be independently insulated/separated to prevent a short.				
B3.7.2	Any and all data acquisition systems or event recorders shall meet B3.7.2				

Section	Rule	Team	TI	Failed Items	RC
Brakes					
B11.2	Vehicle must have two independent brake circuits and separate reservoirs.				
B11.5	Plastic brake lines are prohibited. Any brake lines must be securely mounted and protected from abrasion and fretting. Brake lines must have enough slack to support full motion of the vehicle suspension.				
B11.3	The brakes on the driven axle must operate through the final drive axle.				
B11.4	"Cutting brakes" are permitted provided section B11.1 is satisfied.				
Identification					
B6.2	All vehicles must have a AMB MX transponder. (MyLaps)				
B6.4.2	Transponder must be mounted on driver's right side forward of the seat and within 610mm (24in) of the ground. The transponder must be oriented properly and have unobstructed line to the ground and must be protected from obstacles.				
B5.1.2 ***B5.2.1***	Each vehicle must have three raised numbers, 203mm (8in) tall, 12.7mm (0.5in) high off a contrasting background; two must be affixed to the upper side of the frame, behind the RRH. They must be in the vertical plane on the side of the car (typically between the RRH and FABup). One must face forward, but placement is open.				
B5.1.2	One number shall be visible from the front of the vehicle. Numbers mounted above the SIM shall be less than or equal to 45 degrees from vertical. Numbers mounted below the SIM shall be less than or equal to 15 degrees from vertical.				
Miscellaneous					
B2.5.16	Hydraulic power systems must be properly shielded and documentation of the shielding made available for review by the National Technical Inspectors.				
B9.6	Front or mid-engine cars must meet specification B9.6.				
B4.2.1	Front hitch is tubular, Max OD 1.25 inch, Min OD 1.00 inch. Vertical location between LFS and SIM. Minimum envelope for hook is 2.00 inches longitudinally, and 8.00 inches laterally. The hitch go/no-go gauge must freely pass through the hitch envelope.				
B4.2.2	Rear hitch is plate-style. 0.125 to 0.375 inch thick, Hole Diam 1.0 inch to 1.25 inch. 1.0 inch radial clearance. Minimum attachment width, 3.0 inches.				
A3.6	The technical inspectors can require any modification at their discretion.				

Section	Rule	Team	TI	Failed Items	RC
	Driver Equipment				
B16.1	Baja SAE 2016 Helmet inspection sticker present				
B16.1	One-piece Motorcross style helmet only, fitted with Tear Offs/Roll Off system. Check that tearoffs are installed properly.				
B16.1.1	Neck Support SFI 3.3 must be worn. Horseshoe collars, Leatt, & HANS devices are not allowed.				
B10.5.1	Separate arm restraints meeting SFI 3.3. No older than 3 years as of Jan 1st of competition year as indicated by label.				
B16.2 B16.2.1	Drivers must wear long pants (cotton/Nomex), socks, shoes, gloves and a long sleeved upper garment bearing a factory label indicating it is SFI rated, FIA rated OR fire resistant. No date restriction. Check for good condition.				
B16.2.2	Non fire-resistant outer shirts or jerseys are prohibited.				
	Egress				
B10.5.1	Restraints must be secured to driver restraint system and must separate completely from the vehicle when the driver releases the harness.				
B16.1	Helmet chin guard contacts neck collar when the head is flexed forward.				
B10.2.1	Shoulder belts mounted at or below the driver's shoulders (No more than 102mm (4in) below shoulder level.)				
B10.3.1	The lap belt and anti-submarine belt must be worn in such a manner that it passes over the pelvic area at a point below the anterior superior iliac spines (hips).				
B10.3.2	The mount shall not exhibit noticeable deformation when adjusted.				
B10.1	Belts have sufficient adjustment capacity for largest and smallest drivers.				
B10.5.1	Arm Restraints must prevent arms from extending beyond the plane of the roll cage (plane is defined by RHO and SIM).				
B10.5.2	Cockpit kill switch within easy reach of the restrained driver; Arm restraints do not impede driver's ability to reach kill switch.				
B9.9	Feet can not get trapped in the pedals and the driver's feet can not stick out of the car.				
B9.14	No type of extension to either the control surface or to the driver shall be added to allow the driver to operate the vehicle.				
B11.1	All vehicles must incorporate a foot-operated braking system capable of locking the front and rear statically and dynamically on pavement and unpaved surface (statically checked during tech).				
B9.2	Maximum egress time of 5 seconds, equipped with all safety gear per B16.				
B9.1	Designed for driver protection & easy driver egress in an emergency.				