



Thunder Roadster

Official 2024 National Rules

(Rules subject to change)

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(Note: Latest revisions are in red font, previous revisions are in blue)

1. Introduction

The Thunder Roadster Series was created to meet the needs of competitors seeking a low-cost platform utilizing the purpose-built Thunder Roadster chassis and specified parts designed and manufactured by US Legends Cars International and ToysbyTink. The class was not developed to be an engineering class or a stepping stone to pro racing. This class was developed to be a spec class with focus on fun, safe, and affordable racing that encourages driver development, close competition, and comradery between its competitors on and off the track.

2. Intent

The intent of the rules is to establish a clear precedent for discouraging creative interpretation and instead encouraging a ‘showcase’ of driving skill in this spec series. The series rules seek to eliminate frivolous spending by utilizing specified including chassis, body, suspension, brake and engine parts available through specific authorized dealers or approved aftermarket suppliers. Other than the modifications specifically allowed in these rules, every part of the car must remain as it came from the factory or ToysbyTink. Bad faith protests, unsportsmanlike conduct, and exploiting grey areas for unfair advantages will not be allowed in the Thunder Roadster Series and will be subject to penalties up to and including permanent ejection from the class. The Thunder Roadster is intended to be raced in its preferred class, Thunder Roadster (TR/GTR) and may also compete in the appropriate Super Touring (ST) and Time Trial (TT) classes. For participants who want to reengineer the cars, they may explore its boundaries in the appropriate Super Touring (ST) and Time Trial (TT) classes, but not in the spec Thunder Roadster (TR/GTR) class.

3. Sanctioning Body

The National Auto Sport Association (NASA) sanctions the Thunder Roadster Series competitions. All decisions made by the series administration are final, except under certain conditions, as specified by the NASA CCR. It is also mandatory that all Thunder Roadster Series competitors have both a current copy of the CCR and the Thunder Roadster Series rules with them during all race events. All competitors agree to also abide by the rules set forth in NASA's current Club Codes and Regulations (CCR) and any supplemental rules issued by the Class/Series Directors.

4. Classification

The Thunder Roadster Series is one class with two competitive preparation levels. Eligible Manufacturer Models include the Thunder Roadster or Thunder Cup car originally manufactured by US Legend Cars International that are marketed and sold as a Thunder Roadster GTR through ToysbyTink or other authorized dealers. Replacement parts are supplied through ToysbyTink or approved aftermarket suppliers as permitted in these rules. No modifications may be made to any part or system unless specifically permitted by these rules.

5. Rules Compliance

5.1 Rules Package

The driver is responsible for vehicle legality. The following rules are not guidelines for this class, but an actual listing of the allowed and the required modifications. These rules, manufacturer technical bulletins and addendums specify the only modifications permitted. If these rules do not expressly state a modification is allowed, it is prohibited. No item, which is allowed, shall also perform a prohibited function. Some equipment may be required to support the sponsors that have contributed to the series.

5.2 Rules are subject to change

For long term stability, these rules are designed to govern the class for the next three seasons, however these rules may still be subject to change. Updates on all safety and mechanical improvements will be published to the website www.nasaproring.com/rules.html and will become effective per the date listed on the Technical Bulletin. The goal will be to only make changes for safety components or for parts availability or changes in industry standard. Part number supersession will be noted and become effective upon publication. The most up-to-date version of this document will be available at www.nasaproring.com/rules.html.

5.3 Non-Compliance

Any competition vehicle found to have illegal modifications, either by NASA or series officials at any time during a race event, is subject to penalties per NASA CCR section 17.7.

6. Safety Equipment

6.1. Safety Requirements

All vehicles and drivers shall conform to NASA's Club Codes and Regulations (CCR) that are in effect as of the date of the competition. If in conflict, these regulations supersede the CCR.

6.2. Fire Suppression Systems

Fire suppression system at minimum must meet NASA CCR section 15.1, however a complete Fire Suppression system per NASA CCR section 15.2 is highly recommended.

6.3. Drivers Attire

All drivers attire including driving suits, underwear, gloves, driving shoes, head sock, socks, and Head and Neck Restraint Systems must meet NASA CCR section 15.17 requirements.

6.4. Helmets

A full-face helmet with shield is mandatory and must meet NASA CCR sections 15.17.3 and 15.17.5.

6.5. Arm Restraints

Arm restraints are mandatory per NASA CCR section 15.5.

6.6. Safety Harness

All cars must have a five-or six-point racing harness that meets NASA CCR section 15.5 specifications.

6.7. Racing Seats

Only aluminum racing seats manufactured by a reputable aftermarket manufacturer may be used and must meet NASA CCR section 15.6. Lightening the seat by anyone else other than the manufacture is not permitted. At minimum, helmet side supports are mandatory on both sides of the seat and must be installed as instructed by manufacturer. 'Full containment' aftermarket aluminum racing seats are strongly recommended.

6.8 Mounting of the Seat in a Thunder Roadster

The seat may be moved within the driver's compartment without moving or changing existing bars in the frame or roll cage. The top of the driver's helmet, when seated in the car, must be a minimum of 2" below the top of the roll cage. The seat may be mounted directly to the floor pan. When mounting the seat forward of the rear roll cage mounting points, a flat piece of steel, aluminum, or (2) spacers must be mounted behind the seat to support it against the roll cage. All hardware used to mount seat must be a minimum of grade 5 bolts.

6.9 Roll Cage Safety Light: A forward facing LED safety light mounted to the top of the roll cage is highly recommended.

7. General Rules

7.1 Driver Eligibility

All participating Thunder Roadsters drivers must possess a valid NASA Provisional or Competition License and must be at least 18 years of age as of the date of competition. The Thunder Roadster Series requires all its drivers to follow the on-track conduct of Section 25 "On Course Conduct" of the NASA CCR with consequences outlined in Sections 26 and 27 of the

NASA CCR.

7.2 Car Eligibility

All cars participating in the Thunder Roadster Series must have a valid NASA annual inspection for that racing season with current NASA logbook.

7.3 Transponder Location

The transponder may not be located any further forward than the “A” pillar.

7.4 Cool Suits

Cool suits, helmet blowers, and associated equipment, properly secured, are permitted, providing that none of the items serve any other purpose.

7.5 Data Acquisition

Any standalone GPS driven data acquisition devices (such as the AiM SOLO, SOLO 2/DL, Apex Pro, Garmin Catalyst or similar system) are permitted. RPM may be logged via Coil RPM input on SOLO 2 DL. No other sensors other than GPS systems are allowed.

7.6 Compliance Testing

The Thunder Roadster Series is actively conducting research on the use of in-car GPS monitoring units as a method to balance the performance of each preparation level. AiM or similar GPS data acquisition monitoring will be used as needed as a non-invasive compliance testing method. The Thunder Roadster Series also has the right to have any / all cars sent for dyno verification. The Dyno runs will consist of three separate, reproducible Dyno pulls with SAE correction and a smoothing factor of five (5). All cars will run at 20 psi rear tire pressure. All Dyno graphs must show decreasing power for 300 rpm from the peak horsepower level with pulls to 10,000 RPM during the Dyno testing. Dynamometer tests will be conducted on a Dynojet Model 248 or 224. As a result of these dyno results and on track testing, adjustments may be made to the current preparation levels during the season if deemed necessary to ensure each preparation level is reasonably competitive. See Appendix A for additional specifications and procedures.

8. Thunder Roadster Specifications (General)

8.1 Aerodynamics

Non-Stock Spoilers, air dams, windshields, or other non-stock aerodynamic devices are not permitted however a front valance may be installed for cosmetic appearance. The valance must be made of a non-rigid, plastic material, no more than 4” in height and must be flexible as to bend under air pressure.

8.2 Air Filters

Only stock and K&N air filters and Outerwears Pre-Filters coverings as delivered new by US Legend Cars are permitted. Dual pod foam air filters made by UNI are also legal. Velocity/ram

stacks are not permitted. No components that direct airflow to the carburetors or increase airflow are permitted.

8.3 Ball Joints

The upper and lower ball joints must remain stock, within the stock dimensions, steel thickness, location and configurations as delivered new by U.S. Legend Cars International and may not be reinforced in any way. One or two (1/4" minimum 7/16" maximum) jam nuts are permitted on the upper and lower ball joints. Each ball joint must use at least one jam nut.

8.4 Ballast

All ballast must be clearly visible with white or neon paint/tape and marked with the car number. Ballast shall be securely mounted to the frame, floor board or roll cage of the car. Ballast shall be in segments no heavier than fifty (50) pounds. Each segment, or stack of segments, shall be fastened with a minimum of two (2) 3/8" diameter bolts and positive lock nuts of SAE grade 5 or better. **No ballast may be placed forward of the firewall.**

8.5 Battery

Only a lead acid, or gel cell battery of the same dimensions as stock (7 1/8 x 8 x 6 1/2) or Group Size 26 and 25lb. minimum weight may be used. A top post or side post battery may be used. Motorcycle batteries may not be used. The battery must remain in its stock location and securely mounted. The original stock battery bracket may not be altered in any way. A battery box, terminal coverings or rubber padding around the rear end is also highly recommended. **A battery shut-off switch is mandatory.** The installation of an electrical master "cut-off" switch meeting NASA CCR section 15.8 specifications is required and is recommended to be mounted on the outside right bodywork near the 'B' pillar of the roll cage for easy access by the safety crews in an emergency.

8.6 Bolts and Fasteners

Only steel magnetic bolts equivalent to stock or upgraded steel fasteners and bolts may be used on the Thunder Roadster. Fasteners may be drilled for safety wire, however intentional weight saving modifications are not permitted. Aluminum and titanium bolts are illegal.

8.7 Brakes

Any of the brake parts that are attached to the rear end housing or the front spindles must remain stock, within the stock dimensions, steel thickness, location and configurations as delivered new by U.S. Legend Cars International or ToysbyTink. Cooling ducts for the brakes may be used. Four (4) maximum holes, in the front of body, for cooling ducts may be no larger than 30 square inches each.

FRONT BRAKES: There are two options for the front brakes.

1. Stock Toyota calipers with the corresponding stock non-vented front rotors as delivered by USLCI
2. Wilwood Dynalite 4-piston calipers with the corresponding Wilwood vented rotors. The stock Toyota hubs may be replaced with billet aluminum hubs as provided by Toys by Tink.

REAR BRAKES: There are three options for rear brakes.

1. The stock Wilwood 2-piston calipers with the stock non-vented rear brake rotors as provided by USLCI.
2. The Wilwood Dynalite 4-piston calipers with the stock non-vented rear brake rotors as provided by USLCI.
3. The Wilwood Forged Narrow Dynalite 4-piston calipers with the corresponding vented rotors and hats.

8.7.1 Brake Rotors

Only steel rotors (not drilled or reduced in diameter) are permitted on the front or rear. The minimum permitted thickness of the front brake rotor is 8mm (5/16) wide; the rear rotor minimum thickness is 1/4". The minimum permitted diameter is 10 inches and the maximum is 12 inches including the Wilwood vented rotors and hats as allowed on either front or rear per section 8.7 above.

8.7.2 Brake & Clutch Lines

Rubber, hardline or steel-braided brake and clutch lines are permitted.

8.7.3 Brake Master Cylinder

The brake master cylinder must remain within the stock dimensions, location and configurations as delivered new by U.S. Legend Cars International. The brake master cylinder must remain on the engine side of the firewall. Equivalent aftermarket master cylinder is allowed and must remain in the stock mounting location, using the stock pedal assembly as delivered by USLCI.

8.7.4 Brake Proportion Valves

Only one brake valve, residual valve, pressure valve will be allowed; one unit per complete brake system.

8.8 Bump Steer

Adjustments to bump steer settings will only be permitted by placing spacers between the steering rack and the heim ends of the tie rods or between the front spindle pickup points and the heim ends of the tie rods. No other modifications to adjust bump steer such as changing the height of the steering rack or modifying the spindles are permitted.

8.9 Bumpers

The front bumper must remain within the stock dimensions, steel thickness, location and configurations as delivered new by U.S. Legend Cars International. Bumper tabs must be bolted to the frame horn with a minimum of one bolt. Should the tab become bent during a race, it must be fixed before the next time the car goes on the track to compete or practice. Road course cars must run small oval front bumper and wrap around rear bumper.

8.10 Carbon Fiber

No carbon fiber parts are allowed on any Thunder Roadsters. See point 8.47.

8.11 Carburetors

The carburetors and all components of the carburetor must remain stock as delivered new by U.S. Legend Cars International. Only carburetor jets, needles, slide springs and butterfly screws may be replaced. Butterfly screws may only be replaced with 3m X 6m allen head screws or stock screws. These screws may not be altered in any way other than “stamping” the end to secure the screw. All stock adjusters may be used. No other modifications to the carburetors are permitted. Modifications or components to increase or restrict airflow or fuel flow (such as velocity stacks, heat deflector shields, internal modifications not listed above, etc.) are not permitted. Preparation Level II Hayabusa engines must follow these same specifications with the spec intake available through USLCI dealers.

8.12 Chrome Plating/Polishing

External parts such as bumpers, nerf bars, suspension components and valve/cam cover may be chrome plated or polished.

8.13 Clutch Master Cylinder

The clutch master cylinder must remain stock, within the stock dimensions, location and configurations as delivered new by U.S. Legend Cars International. The clutch master cylinder and reservoir must remain on the engine side of the firewall. No aftermarket clutch master cylinders are permitted. The clutch pedal may be shortened for driver comfort.

8.14 Contingency Sponsor Decals

Contingency sponsor decals are optional, however contingency decals are mandatory and /or use of the product to be eligible for posted awards sponsored by the contingency sponsor.

8.15 Cooling, Engine

An extra fan, internal duct work, remote oil filter, header wrap, and/or oil coolers are permitted inside the engine compartment. These components must be as delivered new by U.S. Legend Cars International. Directing air to the carburetors or air filters is not allowed.

8.16 Drive Shaft

The drive shaft, flanges, and u-joints must remain within the stock dimensions, steel thickness, location and configurations as delivered new by U.S. Legend Cars International. Lightening the drive shaft in any way is illegal. The drive shaft must be painted white or light gray. A drive shaft retainer strap is permitted.

8.17 Fiberglass Components

All fiberglass components must remain within the stock dimensions, location, and configurations as delivered new by U.S. Legend Cars International and may not be intentionally lightened in any way. Cars being converted from EFI to carburetors must cover the opening in the hood for the EFI intake to close off the top of the hood. It is highly recommended that the repair be made with fiberglass to match the original hood as closely as possible. Original holes in body cannot be covered. The lower part of the nosepiece front opening can be removed not to exceed the stock opening (14” – Thunder Car & 14 ½” – GP Roadster). No material can be removed from the top of the front opening. Material may not be removed from the rear bodywork. Holes for airflow are only permitted in the front of the nose. Stock wing as delivered by US Legend Cars

International or approved dealer network must be used on Thunder Car body and may not exceed the factory height of 26 inches above the chassis frame as originally designed on the GT Roadster / Thunder Cup body. Thunder Cup body wing mounting points may not be moved. **No fiberglass bodywork may be below the level of frame rails.** No other modifications allowed except those that must be made to allow for approved suspension modifications and side exhaust exit. The addition of a lower air dam on the nose section of the Thunder Cup body may be added provided it is no greater than 4" in total height, no longer than the perimeter of the nose section, vertical, and made of flexible material as a cosmetic addition only. No lip, splitter, or horizontal additions allowed, and this is not intended as a performance addition. No windshields or cockpit enclosures of any kind. No other changes to the underside on the frame for sealing or aerodynamics are permitted.

8.17.1 Mounting of Component

All fiberglass body components must be firmly attached to cars competing in any race. It is recommended that all dzus fasteners fit tight and are taped over to prevent loosening. Any Thunder Car may be black flagged or denied entry to start a race if any of the aforementioned items are not attached. Removal of undamaged fiberglass components (hood, deck lid, etc.) during an event is not allowed.

8.18 Firewall

A metal firewall is mandatory. The firewall must remain sealed as delivered from U.S. Legend Cars International. Using a "thicker than stock" metal firewall separating the driver's compartment and the engine compartment is permitted.

8.19 Frame

Absolutely no modifications of the frame (including the roll cage) will be permitted unless otherwise noted in this rulebook. Thunder Roadster chassis must be as delivered from USLCI with exception to the following reinforcements performed by ToysbyTink or authorized dealer: Right and left side front chassis clip gusset, rack and pinion gusset plate, and driveshaft tunnel reinforcement tube between the 'A' and 'B' roll cage pillar along the driveshaft tunnel.

8.19.1 Serial number plates

All chassis must be produced by U.S. Legend Cars International.

8.19.2 Metal Fatigue

It is highly recommended to have the frame checked periodically by an expert for metal fatigue. Cracked or broken frames are strictly prohibited from any NASA sanctioned events.

8.19.3 Frame Replacement

If the chassis should become severely damaged, replacement frames must be purchased through U.S. Legend Cars International or ToysbyTink.

8.19.4 Frame Repairing

Only front clips (forward of the A-arm mounts) and rear clips (behind the main rail of the sub frame) may be replaced as long as they are replaced with the exact material that it is replacing, and all pickup points must remain in the stock locations as delivered new from U.S. Legend Cars

International. The clips may be purchased through U.S. Legend Cars International and its dealer network. The driver's compartment of the frame (roll bars, cross braces, etc.) may not be repaired or replaced if damaged. Once a frame is repaired from its original form, U.S. Legend Cars International assumes no liability for any injuries that may occur as a result of this repair regardless of the approval given to compete with that repaired frame.

8.20 Gears Ratios

Only rear end gear ratios listed in the preparation levels in section 9 are permitted. The gears must remain within the stock dimensions, steel thickness, location and configurations as delivered new by U.S. Legend Cars International.

8.21 General Appearance of the Car

All competitors must present a neat, clean and stock appearing car for competition. Crash damaged cars must be repaired to the minimum technical standards before returning to competition. Series officials reserve the right to deny access in competition because of a sponsorship, advertisement, paint scheme and/or lettering on a car not in "good taste," or in the spirit of keeping this a family sport.

8.22 Heim Ends

Only magnetic steel heims as delivered new by U.S. Legend Cars International or magnetic steel heims of very similar dimensions are permitted on a Thunder Car. The stock heims are designed to bend/ break and absorb energy under impact. Heims may be upgraded, however under impact, the upgraded heims may not bend or break as quickly thereby transferring the impact-energy to the driver and an injury may result. Aluminum heims are not permitted.

8.23 Jam Nuts

At least one jam nut is required to be used with all radius rods and ball joints. One or two (1/4" minimum 7/16" maximum width) jam nuts are permitted on the upper and lower ball joints. Upper control arm may have a welded jam nut.

8.24 Control Arms

The lower control arms must remain stock, within the stock dimensions, steel thickness, location, and configurations as delivered new by U.S. Legend Cars International and may not be altered in any way. (Right side include 12 1/2" X 16 1/4" or 12 1/2" X 17" / Road Course Right side 13 1/2" X 17", Left side include 11 1/2" X 16 1/4" or 11 1/2" X 17" / Road Course Left side 12 1/2" X 17"). The stock front control arm clevis may be replaced with a double sheer control arm clevis as long as it does not change the geometry and pickup points.

8.25 Mandatory Series Sponsor Decals and Patches

All cars must have Four NASA decals and a driver uniform patch is required per NASA CCR.

8.26 Mirrors

Cars may use a mirror mounted within the driver's compartment or small mirrors may be installed onto the "A" post. The type of mirror(s) shall be the choice of each individual driver. The interior mirror may not exceed 42 sq. inches in surface area.

8.27 Nerf Bars

The nerf bars must remain within the stock dimensions, steel thickness, location and configurations as delivered new by U.S. Legend Cars International and may not be reinforced in any way. No other types of nerf bars are permitted.

8.28 Numbers / Class Designation

The cars may have either numbers that are a minimum height of 8" on both sides, or may run the series spec 'Thunder Roadster' black number board (8.75" X 11.25") in place of the 8" high numbers. **The front and rear numbers must be a minimum of 3" tall in compliance with the NASA CCR.** The cars must also run either the black 3.5" X 5" TR or GTR class designation tags or must have at least 3" tall TR or GTR class designation next to all 4 numbers. See Diagram A for decal placement.

8.29 Pickup points & spacers

Absolutely no modifications of the frame pickup points, rear end pick up points or spindle points are permitted with exception to the outrigger rear shock pickup and rear lower trailing arm pickup point to accept longer lower trailing arms on the outrigger road racing chassis. Lower trailing arm pickup point must be 39.5" rear of the front lower frame rail and 5.25" up from the bottom of the frame rail +/- 1/4" or as delivered by USLCI. Mandatory lower trailing arm length is 22.5" for long trailing arm and may be upgraded to 5/8" bar with 1/2" holes. A maximum 3/4" wide spacer may be used on all 1/2" diameter bolts.

8.30 Rack & Pinion Steering

Only the rack & pinion steering box as delivered new by U.S. Legend Cars International and stamped 600 Racing or Mid State Machine is permitted. A Stiletto-brand or unmarked rack & pinion steering box is not permitted.

8.31 Radios are Permitted

Two-way radios will be permitted in competition.

8.32 Radius Rods/Panhard Bar

The radius rods and panhard bar must remain within the stock dimensions, thickness, location, and configurations of the stock component, as delivered new by U.S. Legend Cars International (7.5", 10", 11", 12", 13", 22.5"). Each length measurement will have a tolerance of +/-1/8" (0.125"). Steel panhard bar is MANDATORY. Panhard bar may use either mounting location on rear housing. Rear trailing arms and pinion bar may be upgraded to 5/8" bar with 1/2" holes.

8.33 Rear Axles

The long and the short rear axles must remain stock, within the stock dimensions, steel thickness, location and configurations as delivered new by U.S. Legend Cars International and may not be reinforced in any way. If one-piece axles are used, they must be stamped and be as delivered by U.S. Legend Cars International. Large axles and spool may be also used as delivered by USLCI dealers for Road Racing applications.

8.34 Rear Ends

Only 10 bolt pattern/wide flange (5/8") Toyota, locked-steel rear ends are permitted. All rear end components to include the housing, and pickup points must meet the specifications of the stock components as delivered new by [USLCI](#) or [ToysbyTink](#). The rear end must be locked (spider gears welded or steel spool of a minimum 6.0 pounds, 5.25 pounds for a 2:50 or 2.93 spool, as currently delivered through U.S. Legend Cars International only). No limited slip differentials, aftermarket differentials, quick change rear ends, floaters, homemade or otherwise are permitted. Only OEM bearings are permitted. No hemispheric, ceramic, or similar type bearings are permitted. No spacers are permitted between the backing plate and bearings. Axle tube material must be 3" O.D. and .120" wall thickness. A "double-shear" rear-end housing is available through U.S. Legend Cars International. (Competitors are allowed to upgrade to the stock U.S. Legend Cars International "double-shear" specifications). Additional reinforcement and 1.25" wider housing to accommodate the outrigger suspension for road racing legal.

8.35 Ride Height

Frame clearance must be a minimum of 3". This measurement is to be checked without the driver in the car. Tires may be aired to 25 psi after race-cool down to verify ride height.

8.36 Sheet Metal

The minimum thickness of sheet metal is .036". The stock sheet metal may not be removed or altered in any way.

8.37 Shocks

All cars must use spec Bilstein shocks as delivered new by U.S. Legend Cars International for use on a Thunder Roadster. **The shocks must be stamped with INEX logo.** Changing or altering the shock or fluid or pressure inside is illegal. Altering or tampering with the shocks or competing with the same, will result in a penalty from probation to an indefinite suspension. Shocks may be turned upside down. Shock bumpers are permitted (maximum 1/4" tall).

8.38 Spindles Aluminum spindles (and pickup points) must remain stock, within the stock dimensions, thickness, location and configurations as delivered new by U.S. Legend Cars International. **Repairing a broken or cracked aluminum spindle is not allowed.** Steel spindles are not allowed for use on Thunder Roadsters.

8.39 Springs

All Thunder Roadsters must use 10" or 8" springs. Any spring weight combination and aftermarket springs of stock design, no barrel springs or progressive springs are acceptable. Only one spring is permitted per shock. Spring rubbers are not permitted.

8.40 Sprocket Adapters

The sprocket adapters must remain stock, within the stock dimensions, steel thickness, location and configurations of the original, as delivered new by U.S. Legend Cars International. Setscrews for the sprocket adapter nut are permitted. Lightening the sprocket adapter for weight savings in any way is illegal. Preparation Level 2 cars may use an aluminum sprocket adapter available through ToysbyTink.

8.41 Steering Column

The steering shaft or steering column bracket may be modified for driver comfort or safety by altering the length of the shaft or by altering the steering column bracket that connects to the dash. Intentional lightening for weight saving measures is not permitted. Modification of the driver's compartment roll-cage is not permitted. The steering shafts must remain stock, within the stock dimensions, steel thickness, location and configurations as delivered new by U.S. Legend Cars International and may not be reinforced in any way. Upgraded steering shaft joints are acceptable.

8.42 Steering Wheels

Larger or smaller steel or aluminum steering wheels are permitted. Quick release steering hubs are mandatory.

8.43 Tires

The tire must be a Hoosier 26.5/8.0-15 "Roadster Edition". Tires may not be soaked, softened, siped (razor cuts), needled, grooved or recapped. Wet weather tires must be American Racer USLCI 82/8.0-15 or Hoosier 26.5/8.0-15 E-MOD M-30S as delivered by U.S. Legend Cars International. Competitors may also run the non-Roadster Edition 880 Hoosier tire, which is item number 10420, size 26.5/8.0-15 which may be purchased from any Hoosier dealer.

8.44 Traction Control Devices

No mechanical, electronic, or computerized wheel spin/traction control devices are permitted. Any driver caught using these devices will face penalties from probation to being permanently ejected from the series.

8.45 Upper Control Arms

The upper control arms must remain stock, within the stock dimensions, steel thickness, location, and configurations as delivered new by U.S. Legend Cars International and may not be altered in any way.

8.46 Width

Maximum width at the widest part of the tire may not exceed 65 inches.

8.47 Weight

The minimum weight will be based on the listed preparation level and engine combination below. It is the responsibility of each team to ensure that their car meets the weight requirements on the scales used by the NASA officials. A car found to be underweight will be disqualified for that session. Lightening "stock" components by shaving, milling, drilling or any other method is illegal. Any item that is used (other than what is mentioned in the rules) as a weight saving method is considered illegal.

Any replicated stock or non-stock components made of titanium, carbon fiber, or other exotic material for weight savings are illegal, will be confiscated immediately, and the offending driver will be permanently ejected from the series.

8.48 Wheels

Wheels must be stock as delivered new by U. S Legend Cars International (8 inches wide by 15 inches in diameter with 3 inch back spacing weighing at least 17 lbs.). The minimum weight of a wheel & tire combination must be at least **33 pounds** without additional steel, lead, or wheel weights. All wheel weights must be covered with duct tape. Bleeder or relief valves are not permitted in the wheels. No wheel spacers allowed.

9. Engine, Transmission, and Fuel Specifications

9.1 Engine

Only mass produced, motorcycle engines with stock transmissions, manually shifted without aid of electronic, hydraulic, or pneumatic actuation, that are classified in one of the two preparation levels below, may be used provided it complies with all the specifications listed below. Any performance modifications to the engine to alter the factory stock horsepower is strictly prohibited unless otherwise noted below.

9.2 Preparation Level 1: Thunder Roadster

Yamaha 1200 or 1250 with stock Mikuni BS36 carburetors and black ignition coils / box as delivered from US Legends Cars. Air cooled or water-cooled conversion approved. 2:93 or 3:30 rear end gear mandatory.

9.3 Preparation Level 2: Thunder Roadster GTR

Must run a Gen I or II Suzuki Hayabusa engine with stock Mikuni BS36 carburetors and spec intake manifold as delivered by ToysbyTink. Absolutely no modifications are allowed to the intake manifold including the addition of ports for vacuum balancing. ANY performance modifications to the engine to alter the factory stock horsepower, including but not limited to, higher compression, aftermarket camshafts, valves, valve springs, and adjustments to the Suzuki OEM timing are **STRICLY PROHIBITED**. Only oil pump gears, oil pans, and oiling system components may be upgraded to maintain adequate oil pressure available through ToysbyTink or approved dealer per section 11.10 of these rules.

All rear end assembly rules per section 8.34 apply including locked, Toyota rear end with spool and 3:58 rear end gear mandatory.

Weight: Post-race minimum weight with driver 1,600 lbs.

9.4 Engine Coolant

Use of an ethylene glycol (coolant) is prohibited. Substitute coolants (e.g. “Water Wetter”) are highly encouraged for all competitors.

9.5 Exhaust System

The header, gaskets and muffler must remain the stock dimensions, steel thickness, location and configurations of the original, as delivered by U.S. Legend Cars International. Stainless or standard steel headers allowed. An aftermarket muffler is allowed only to meet local sound regulations and must be mounted in the same configuration. The internal components of the header may not be altered. Header wrapping (tape) is acceptable. Ceramic or baked on coatings are not permitted.

9.6 Fuel

Only petroleum-based unleaded gasoline as defined by the American Society of Testing and Materials (ASTM) is permitted with a maximum of 93 octane. **At the discretion of the Regional Series Leader or National Director, fuel may be obtained only from a designated fuel station near the track. Testing may be performed to confirm compliance with a known fuel sample including testing with digitron and/or specific gravity. Notification of the designated fuel station will be confirmed no less than 3 days prior to the first timed session on track.**

9.7 Fuel Cell

Must be stock steel fuel cell or 10-gallon Fuel Safe FIA-FT3 Fuel Cell as delivered new by U.S. Legend Cars International and must remain in the stock location. Foam is mandatory in all fuel cells as delivered by U.S. Legend Cars International. Fuel Cap must remain tight at all times on the racetrack. Fuel cooling devices of any kind are not permitted on the car at any time.

9.8 Fuel Lines

Fuel lines may not be located in or run through the driver's compartment. Fuel lines may not be attached to the electrical wires.

9.9 Fuel Filter

Aftermarket fuel filters may be used. No glass fuel filters will be permitted. No fuel filters are allowed in the engine compartment.

9.10 Fuel shut-off Valve or Fuel Regulator

Aftermarket fuel shut-off valves and fuel regulators are permitted.

9.11 Oil Coolers & Lines

Oil coolers must be cooled by air only (no dry ice systems or other type). All oil cooling systems (including lines) must be mounted outside the driver compartment. No oil coolers or lines may be mounted in the driver's compartment. Multiple oil coolers are permitted. Oil cooler fans are permitted. Push-lock fittings are permitted. Oil coolers may not be mounted below the minimum ride height. Oil coolers must remain stock as delivered by U.S. Legend Cars International, competitors may upgrade the front small oil cooler to the larger cooler as delivered by ToysbyTink.

9.12 Oil Additives

Any competitor caught using any of the following additives in the engine oil will be permanently ejected from the series and all future events: hydrazine, toluene, dinitrotoluene, dioxane, propylene oxide, nitromethane, or nitropropane, or any additives determined to be hazardous.

9.13 Gauges

Any analog gauges that display the following information are permitted: cylinder head temperature, RPM, oil pressure, oil temperature, water temperature, voltage, air/fuel ratio, and speed. Digital gauges are allowed. GPS driven data logging systems are permitted per section

7.5 requirements. Onboard telemetry systems are not permitted. Direct reading oil temperature and oil pressure gauges must use steel braided lines, not plastic or rubber

10. Preparation Level One Specifications: Thunder Roadster

The engine must be a Yamaha 1200 or 1250 (sealed or unsealed). Only changes as described in this section of the rulebook are permitted. The only modifications allowed to the engine are as follows:

- A. Changing the carburetor jets and needles
- B. All stock carburetor adjusters may be used
- C. Adjusting the valve shims
- D. Installing an aftermarket clutch and spring of original design (no aluminum clutch plates)
- E. Upper head oilers, heavy duty valve springs, “pinned” camshafts and steel sleeves are permitted

10.1 Water-Cooled Engines

Water-cooled engines must retain all components in their original configuration in their original position as delivered by U.S. Legend Cars International and as described in the official installation instructions provided by U.S. Legend Cars International. Any radiator or water pump may be used. Electrically operated fans with manual or automatic actuation may be added.

10.2 Alternators

Modification to the charging system is not permitted. The alternator must be charging at all times. No switches disconnecting the alternator are permitted. The car must continue to run at an idle with battery disconnected.

10.3 Clutch

The clutch (plates and springs) may be replaced with any aftermarket type of the same design. Aluminum clutch plates are not allowed. A billet clutch basket will be allowed. The billet basket, primary drive gear, shims and springs must weigh a minimum of 5.5 lbs.

10.4 Cranking Compression

Changing the cranking compression by altering the cam gear or cam gear bolts is not allowed.

10.5 Engine Coatings

Only coatings as delivered stock from the factory are permitted. Intentional removal of any coatings is not permitted. Repainting the outside of an engine, and using an unpainted engine is also permitted.

10.6 Engine Location & Mounts

The engine and upper or lower engine mounts must remain within the stock dimensions, steel thickness (no aluminum mounts), location and configurations as delivered by U.S. Legend Cars International. Rubber mounts will be permitted as long as the engine remains in the stock location.

10.7 Engine Serial Numbers

All engine casings must have a serial number.

10.8 Ignition System

The complete ignition/engine control system must be the original OEM parts for the Yamaha XJ 1300. The electrical harness may be replaced only with the electrical harness connector kit as delivered through U.S. Legend Cars International. Electronic throttle (traction) controls are not permitted. In-line fuses are only permitted (no fuse blocks are permitted). Ignition pickup coil wires must run directly to the ignition box and may not be taped or tie wrapped to other wires. No open wire ends or unused connectors allowed within reach of the driver. The stock ignition control box (**Yamaha XJ** as delivered by U.S. Legend Cars International) are the only boxes permitted to be used and may not be altered in any way. The ignition control box must be mounted as currently delivered by U.S. Legend Cars International. Only one box is permitted on a car (multiple boxes are illegal). **Coils, Coil Wires and Spark Plug boots** must be stock Yamaha XJ1300 parts as delivered new by U.S. Legend Cars International. The spark plugs may be replaced with any aftermarket type with similar thread size. Resistors must remain in spark plug wires. The ignition rotor must be a stock Yamaha XJ 1300 part as delivered new by U.S. Legend Cars International. No aftermarket electronic ignition advancers are permitted. The ignition plate must be a stock Yamaha XJ 1300 part as delivered new by U.S. Legend Cars International. The ignition pickup cover is not mandatory.

10.9 Remote Oil Filters

Remote oil filters must be mounted in the engine compartment only. The remote oil filter must be located in a position where it cannot be easily damaged in the event of an accident. Remote oil filters may not be mounted below the minimum ride height (3 1/2"). Inline "screen type" filters may be used in place of the remote "spin on" type oil filter.

10.10 Oil Catch Cans

Oil catch cans (maximum 1 quart capacity each) can be used. It must be securely fastened and remain within the engine compartment. It may only be plumbed in by hose from the stock crankcase breather opening and/or the oil fill cap. A return line may be run to the stock return fitting on the oil pan.

10.11 Oil Crankcase Breather

The only location that the crankcase may have a breather is under the carburetors at the stock outlet and/or in the oil filler cap. This breather may not be evacuated through the exhaust pipe (header). There may not be any additional breather holes for the crankcase. Breathers and hoses must remain within the engine compartment. Baffles used in the hoses are permitted.

10.12 Oil Pump

The stock oil pump may not be modified in any way. Relief valves may be shimmed.

10.13 Valves

Only stock valve lifter and adjuster shims may be used.

10.14 Body

Level 1 prepared cars may run either the open wheel Thunder Roadster body or the closed wheel GT Roadster / Thunder Cup body. If the closed wheel GT Roadster / Thunder Cup body is used, it must run with the rear wing.

10.15. Weight

Post-race minimum weight with driver 1,500 lbs.

11. Preparation Level Two Specifications: Thunder Roadster GTR

The engine must be a factory-stock Generation I or II Suzuki Hayabusa engine. Only those changes as described in this section of the rulebook are permitted. The only modifications allowed to this engine combination are:

- A. Changing the carburetor jets and needles
- B. All stock carburetor adjusters may be used
- C. Installing heavy duty clutch springs of original design
- D. Internal oiling system upgrades are permitted

11.1 Water-Cooled Engines

Suzuki Hayabusa Gen II (2008-present) with no internal modifications with exception to the following:

- Oiling system – See below
- Cooling system – Thermostat may be removed or replaced with a cooling system restrictor. Otherwise all other internal engine components must remain as delivered from Suzuki.

Note: Gen I (1999-2007) engines are allowed, however they must remain stock as delivered by Suzuki and may only have the internal modifications listed above. No performance modifications will be allowed to balance the performance deficit to the Gen II engine.

11.2 Alternator

Modification to the charging system is not permitted. The alternator must be charging at all times. No switches disconnecting the alternator are permitted. The car must continue to run at an idle with battery disconnected.

11.3 Clutch

Stock clutch required; however heavy-duty springs are allowed.

11.4 Cranking Compression

Changing the cranking compression by altering the cam gear position is not allowed.

11.5 Engine Coatings

Only coatings as delivered stock from the factory are permitted. Intentional removal of any coatings is not permitted. Repainting the outside of an engine, and using an unpainted engine is

also permitted.

11.6 Engine Location & Mounts

Engine must remain in stock location with stock mounts included in the Hayabusa conversion kit as delivered by ToysbyTink.

11.7 Engine Serial Numbers

All engine casings must have a serial number.

11.8 Ignition System

SBD system only as delivered in the Hayabusa conversion kit available through ToysbyTink authorized dealer.

11.9 Remote Oil Filters

Remote oil filter and lines may be removed in its entirety.

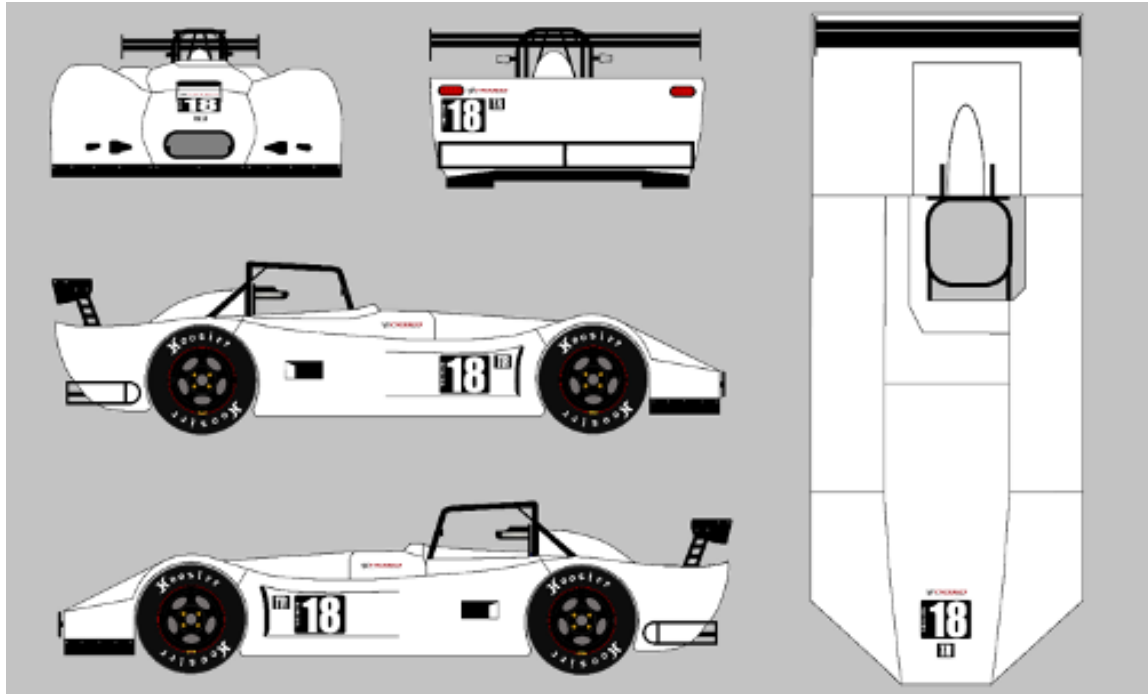
11.10 Oil Pump

No dry sump systems allowed. Oil pump drive gear may be replaced on Hayabusa with APE high-volume oil pump gear (PN OPG1300GSX). To maintain constant oil pressure, an oil restrictor may be placed in main oil passage to the upper cylinder head and stock oil pan may be replaced with billet oil pan kit and windage tray included in the Hayabusa conversion kit available through ToysbyTink. Stock balance shaft may also be replaced with APE Hayabusa Crank Balancer Dummy Shaft or stock balance shaft may be welded. Accusump / Accumulator allowed.

11.11 Body

Level 2 prepared cars must run the closed wheel GT Roadster / Thunder Cup body including the rear wing (see Diagram A).

Diagram A



Appendix A: Max/Min Power Rule

To verify compliance and to provide maximum parity in the class, NASA may employ chassis dynamometer testing to verify compliance. Based on actual dyno testing results of know legal motors, the **average power must be no greater than 158 hp** and the **average torque must be no greater than 111 lb-ft**. Three consecutive "official" dyno pulls must be performed and the average result of the three pulls in each category of HP and Torque (rounded to the nearest tenth) will be used for compliance.

If the average of three pulls (HP or TQ) is outside the required bands, the car would be DQ'd. The competitor may attempt to detune their motor for the next race, but after three DQs, the motor would be designated "non-legal" for the series.

Engine Dynamometer Testing Procedure

To ensure objectivity, a Thunder Roadster Series official, an appointed official, or an approved technician will operate any cars being inspected on the chassis dynamometer. NASA, its officers, officials, and assigns are not responsible for any mechanical failures or damage otherwise while the dyno runs are being performed.

1. The DynoJet brand is the required type of dyno for testing and inspection. All dyno readings must be corrected to SAE J1349 Rev JUN901 and the dyno's smoothing function set to 5. Location of the dyno shop should be recorded.
2. Prior to the chassis dynamometer inspection the competitor may top off any fluids needed to ensure the engine and drivetrain are not damaged during testing. The fluids must be added with

a NASA Technical Inspector present, and no other modifications or adjustments may be made to the car.

3. All dyno pulls will be made with the hood opened.

4. Prior to the first official run, an official or technician will confirm that the accelerator pedal opens the throttle completely and that the wide-open throttle is achieved.

5. Dyno pulls will be made in 4th gear.

6. During an official dyno test, the car must be fitted with the tires used on the car in the previous session.

7. Electric engine fans and or external cooling fans may be used while the car is on the dyno.

8. Dyno runs shall be made with water temperature in the normal operating range of 165F-210F and drive train fluids up to a normal running temperature. Should the water temperature exceed 210F during any pull, that pull is void and shall be repeated once the engine has cooled enough to operate within the specified range. Water temperature may be verified using external temperature measurements such as an infrared temp gun at the thermostat housing.

9. Three consecutive runs shall be made under full power. The RPM range shall be consistent for all three runs. Starting RPM shall be no higher than 2000. Ending RPM shall be when the rev limiter engages at approximately 10,000 rpm.

10. Should any run result in an erratic or non-repetitive result, series officials may dismiss the result or request another dyno pull.