



CAMARO-MUSTANG CHALLENGE™
racing series

Camaro Mustang Challenge

2018 National Champion Kevin Jander



2019 EDITION V1.0

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Camaro Mustang Challenge

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1. Introduction

The following rules are not guidelines for this series but an actual listing of allowed and required modifications. The only legal modifications are those specifically allowed by applicable rules. If not specifically allowed, any modifications are prohibited. Some equipment may be required to support the sponsors who have contributed to the year end points fund.

2. Intent

The intent of the Camaro Mustang Challenge (CMC) racing series is to provide National Auto Sport Association (NASA) members a racing series featuring production American pony cars. Modifications will be limited to those necessary to promote safety, close competition, and flexibility to enable drivers to learn and experiment with the principles of race car setup within boundaries intended to limit expenses, thereby providing the drivers with fun, exciting, and challenging yet approachable racing.

Good sportsmanship is valued more than finishing position. This means clean, well-executed passing is a trademark of the series. Punting another competitor, or leaning on them to gain a position will not be tolerated. Car to car contact including bump drafting can result in an investigation and possible sanctions

3. Sanctioning Body

The Class/Series is supported and sanctioned by the National Auto Sport Association (NASA). All race events are governed by the rules set forth by the Class/Series Directors and NASA officials. All competitors agree to also abide by the rules set forth in NASA's current Club Codes and Regulations (NASA CCR) and any supplemental rules issued by the Class/Series Directors.

4. Eligible Manufacturers/Models/Configurations

Ford Motor Company (Early Ford)

Eligible Early Ford makes and models:

1979-95 Ford Mustang with 5.0 V8 including 1993-1995 Cobra (1993 and 1995 Cobra R models excluded)

1979-86 Mercury Capri with 5.0 V8

1996-2004 Ford Mustang with 4.6 2valve V8

1996-04 Ford Mustang with 4.6 DOHC N/A V8* (2000 Cobra R and 2003-2004 Cobra models excluded)

* IRS cars must replace the IRS with standard Mustang live axle

General Motors (Early GM)

Eligible Early GM makes and models:

1982-92 Chevrolet Camaro (all submodels with V8 motors eg – RS, Z28 etc)

1982-92 Pontiac Firebird (all submodels with V8 motors eg Formula, Trans-Am, WS6 etc.)

General Motors (Late GM)

Eligible Late GM makes and models with 5.7L V8 motors

1993-02 Chevrolet Camaro (all F-Body models with LT-1 or LS-1)

1993-02 Pontiac (all F-Body models with LT-1 or LS-1)

5 Safety

5.1 Safety Requirements

All cars and drivers must conform to NASA's *Club Codes and Regulations* (CCR).

5.2 Class Safety

The Event Director or any CMC Official may exclude any car for any item that is deemed to be unsafe.

5.3 Steering Wheel Lock

The steering wheel lock must be removed or defeated.

5.4 Air Bags

Air bags must be disabled while under competition conditions. The air bag does not need to be removed.

5.5 Sunroofs/Moonroofs

Sunroofs/moonroofs (glass) must be removed and replaced with a sheet metal piece securely covering the opening. A metal sunroof/moonroof may be retained.

5.6 Drive Shaft/Torque Arm Safety Loops

All cars must use a suitable drive shaft safety loop to contain the front/transmission end of the drive shaft and torque arm if applicable in the event of a universal joint or torque arm mount failure. Some cars have OEM chassis bracing that meets this requirement. The installation of additional safety loops to contain the rear/differential end of the drive shaft and/or torque arm is not required but is allowed and recommended.

5.7 Scattershield

The installation of a scattershield or explosion-proof bell housing is not required but is allowed and recommended.

5.8 Master Switch

An electrical master switch is required. The installation of the electrical master switch must meet the requirements listed in section 15.8 of the CCR.

5.9 Fuel Safety Cell

The installation of a fuel safety cell meeting CCR requirements is not required but is allowed and strongly recommended. The fuel cell maximum size is limited to 24 gallons. S197 chassis Mustangs

may replace the OEM mid chassis mounted fuel tank with a fuel cell mounted in the rear trunk area between the frame rails in the manner prescribed by the CCR.

5.10 Fire Extinguisher/Fire System

All cars must have at minimum a fire extinguisher meeting CCR requirements. The installation of an on board fire system meeting the CCR requirements is not required but is strongly recommended.

5.11 Convertible/T-top Cars

Convertible/T-top cars in the eligible models and years are allowed. Convertible cars must have an additional support bar in the roof of the roll cage running either running from front to back located in the centerline of the car, or diagonally from the front driver side to rear passenger side. This bar is not required but strongly recommended for T top cars. Convertible/T-top cars must use driver arm restraints as required by the CCR unless permanently fixed roof panels have been installed. Convertible cars must run with the top down during competition and provide suitable means of securing the top in the event of a rollover, or may remove the top and operating mechanism. T-top cars must remove the T-tops during competition unless permanently fixed panels have been installed. All OEM structural additions for convertible/T-top cars must remain in place. Hard top cars may not be made into convertible or T-top cars.

5.12 Door Safety Bars

In addition to meeting all of the CCR specifications the roll cage in a CMC car must meet the following additional specifications. At a minimum at least two door safety bars must be used on the driver's side, and one door safety bar on the passenger side. Gutting of the doors beyond what is solely necessary to fit cage bars is allowed. However, removal of the OEM door impact beams is only allowed if door bars extend out towards the door skin on the driver's side, and on the passenger side if a minimum of two door bars are used.

5.13 Driver Comfort

Driver comfort items such as cool suits, windshield defogger blowers etc. are allowed as long as they have no impact on car performance.

6. Modifications

6.1 Allowed Modifications

Other than those items specifically allowed by the rules, no other part or component may be modified, removed, or disabled. If there are any "questionable" or "gray" area modifications, the competitor shall contact the CMC Board of Directors for clarification before competition.

Replacement parts must be *original equipment manufacturer* (OEM) or others of equivalent OEM specifications. (i.e. – OEM replacement parts from any retailer are allowed provided they meet OEM specifications and do not offer a performance improvement over the OEM part they replace.)

Limited production components and/or prototypes must be approved by a Series Director prior to competition to ensure their use and lack of availability to all competitors will not result in a competitive advantage.

6.2 Appearance Requirements

6.2.1 All cars are required to prominently display at least four official NASA racing stickers, one on the front, rear, and one on each side.

6.2.2 Series sponsor or individual race sponsor decals or stickers may be required. Drivers must also display any series required patches and NASA patches on their driving suits.

6.2.3 All windshields shall have the standard Camaro Mustang Challenge banner across the top. Digital files for the banner can be obtained from CMC Officials. The driver's last name, or first initial

and last name, must be displayed on the lower passenger side section of the windshield in tall, bold, white block letters.

6.2.4 The car must exhibit its assigned car number on both sides, front and rear of the car. The side numbers must be at least ten (10) inches tall and be of a contrasting color. The front and rear numbers must be at least four (4) inches tall. Class identification must be at least four (4) inches tall and be located in close proximity to the number on each side and rear of the car.

6.2.5 No tinted windows allowed other than factory OEM tints.

6.3 Update/Backdate Non-body Components

Non-body components may be updated/backdated within cars of the same manufacturer on the eligible manufacturers/models list (i.e. 1982-92 GM Early components may NOT be interchanged with 1993-02 GM Late components) unless noted elsewhere in these rules.

6.4 Allowed Body components and Update/Backdate of Body Components

Unless specified elsewhere in these rules, body components of only the models listed below may be used. OEM body components, unit body, and subframes may be updated/backdated only within the years, make and model groups as follows.

1. 1982-1992 Chevrolet Camaro RS, Z28, IROC-Z
2. 1993-2002 Chevrolet Camaro RS, Z28, SS
3. 1979-1993 Mustang L, GL, GLX, LX, GT, Turbo GT, Cobra (not Cobra R)
4. 1994-1998 Mustang base model, GT, Cobra
5. 1999-2004 Mustang base model, GT, Cobra (not Cobra R)
6. 1979-86 Mercury Capri
7. 1982-92 Pontiac Firebird Formula, Trans-Am
8. 1993-2002 Pontiac Firebird Formula, Trans-Am, WS6

For clarity, the Mach 1 and 2003-2004 Cobra chin spoilers/air dams are not allowed.

6.5 Body

6.5.1 Replacement body components must be OEM stock or an OEM replacement. The following body modifications are allowed:

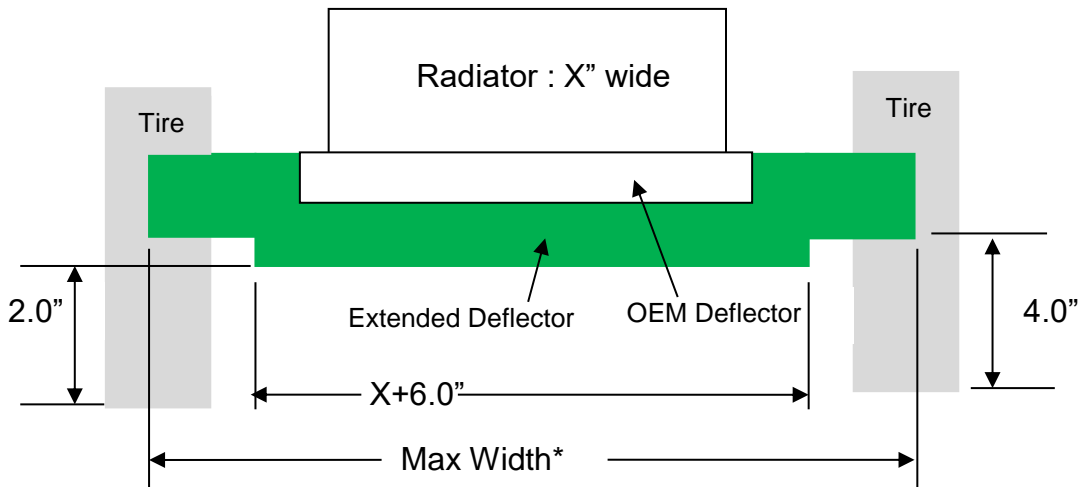
1. Fender/quarter lips may be rolled inward for tire clearance and may not be flared outwards.
2. Plastic interior wheel opening panels may be removed.
3. Ford cars 1994-1998 may modify the quarter panels as needed in order to gain rear track width up to the maximum stated in 6.3.
4. Ford cars up to and including 1993 may modify the fenders and quarter panels, including adding aftermarket flares, and body mounts as needed in order to gain track width up to the maximum stated in 6.3
5. All allowed bodywork modifications must conform to CCR 18.1.3 and must have no other function than to gain tire clearance.

6.5.2 The slotting, cutting, or drilling of the front bumper cover, headlights and underlying bumper structure may be modified by both removing material and adding ducting material to provide additional cooling air to the radiator, brakes, or coolers is allowed provided that:

1. No more than 120 square inches of material is removed from the bumper cover
2. No more than 30" total width of material, measured horizontally, is removed from the underlying bumper structure. In no case may a one piece bumper structure be cut into two pieces.

6.5.3 OEM foam or honeycomb plastic impact absorbers under the bumper covers may be removed, though this is not recommended. OE steel/aluminum/composite impact beams and impact absorbers must remain in place. The OE impact beam may be modified as per 6.5.2. Additional fasteners and/or brackets/supports may be added to attach/support the bumper covers as long as these only serve to support the cover, are not designed to act as impact absorbers or aero devices, and the bumper cover remains in the OE location.

6.5.4 No body component with the exception of the radiator air deflector shall be lower than 4.0" measured vertically from the ground. Radiator air deflectors may be removed, modified, or substituted according to the diagram below and must be centered at the same front/back location as the OEM deflector +/- 1":



* Max Width shall be 55" or the car's OEM air deflector, whichever is greater

6.5.5 Any rear spoiler/wing that fits the following criteria may be used:

1. A vertical line from every point on the spoiler/wing and end plates must intersect the car body/bumper cover when the car is on a level surface.
2. The maximum height of any point on the spoiler/wing from any point on the deck lid/rear hatch may not be greater than 12.0 inches.
3. The overall depth (leading edge to trailing edge) including end plates may not be more than 12.0 inches.
4. The spoiler/wing and mounts as installed must be readily available to the public from a retail source for less than \$700.
5. The wing must be fixed for competition and may not be adjusted from the driver's seat

6.5.6 Hood pins must be fitted. Trunk pins may be fitted. Stock hood and trunk latches may be replaced with clips. The car must be run with the hood, doors, and trunk completely closed and securely latched.

6.5.7 Windshield clips as described in 15.13 of the CCR are optional but strongly recommended. Rear window clips are optional but strongly recommended.

6.5.8 All OEM antennas, emblems, weather-stripping, moldings, trim, and window channel trim, including all associated clips, retainers, and hardware may be removed. A smooth filler panel may be added to door window sills to aid in emergency egress.

6.5.9 Any body modification not specifically allowed within these rules that improve or appear to improve aerodynamic performance (increased downforce or decreased drag) are not allowed.

6.5.10 All chassis, structure, and body repair must be done as close as possible to the OEM factory specifications and OEM stock contours. Unless specified elsewhere in these rules, no additional chassis/frame strengthening is allowed.

6.5.11 A section of the floor may be cut and a trap door added in order to enable changing the in-tank fuel pump without removing the tank.

6.5.12 A strip of up to 1x1x1/8" angle iron may be welded to the bottom of the K member to protect the oil pan.

6.6 Chassis Strengthening

6.6.1 The frame or subframe shall be stock for the body used. The front and rear subframes may be tied together (front to rear only) with subframe connectors. The subframe connectors may be bolted or welded to the unmodified subframes, but may not be welded or bolted to the floor along the length of the subframe connector. The subframe connectors may not pass through the floor or intrude into the inside of the car. OEM seat mount points may be altered or reinforced. The reinforcement may tie into the subframe connectors or the cage but may not span across the floor from driver to passenger side.

6.6.2 One bolt in stay rod may be fitted between the upper front strut towers and between each strut tower and the firewall/wiper cowl. The minimum distance between the center of any of the stay rod's bolting points to the edge of the base plate for the roll cage's 7th/8th points is 18 inches.

6.6.3 A lower chassis front suspension brace (G-load brace) may be fitted. It must bolt on only using a maximum of four existing OEM factory holes or mounting bolts and no cutting, welding or other modifications may be made to the structure of the car to install this brace.

6.6.4 A front steering brace may be fitted. It must bolt on only using a maximum of four existing OEM factory holes and no cutting, welding or other modifications may be made to the structure of the car to install this brace.

6.7 Ballast

Up to 150lbs of ballast is allowed, but no farther rearward than the plane of the front of the main hoop of the roll cage. Each ballast piece may not be taller than three inches or stacked higher than three inches. Ballast must be securely fastened and approved by NASA tech/safety officials. Battery boxes, cool suit mounts, and other added components made excessively heavy may be determined by NASA tech or CMC Officials to serve as ballast and therefore not allowed farther rearward than the plane of the front of the main hoop.

6.8 Interior

6.8.1 The driver's seat must be replaced with a seat suitable for competition. The driver's seatback must be reinforced by bracing the seat back to the roll cage unless the seat conforms to current FIA standards, which do not require a seat brace. A head restraint system meeting the CCR requirements must be used to cushion the driver's head from behind.

6.8.2 Any steering wheel may be used other than wooden models. Quick release mechanisms and spacers may be used to move the steering wheel location, but the OEM steering column must be used.

6.8.3 Modifications may be made to the foot pedals to improve the comfort and control accessibility for the driver. The pedal assembly must be mounted to the chassis using the original mounting points. Note: Rules 6.8.2, 6.8.3, and 6.27.4 may not be combined to relocate the driver excessively rearwards for weight distribution.

6.8.4 Gauges may be replaced or added.

6.8.5 Any interior or exterior mirrors may be used.

6.8.6 The OEM stock dashboard must remain intact except to accommodate the installation of the roll cage. Structure under the dash may be removed or trimmed as long as the dashboard and steering column remain in the OEM location and are properly mounted. Any unused dash or steering column mounted components such as A/C controls, air bags, etc. may be removed. Openings larger than 6 square inches that result from component removal must have a suitable metal or plastic cover. Dash trim pieces may be substituted with suitable metal or plastic pieces.

6.8.7 Other than the stock dash, all other interior parts and panels, including all passenger seats may be removed. Undercoating may be removed. Floor mats, spare tire, tools, jacks, etc. must be removed. There must be no remaining sharp edges that could come in contact with the driver. Other than to provide for the installation of required safety equipment or other authorized modifications, no other driver/passenger compartment alterations or gutting is permitted.

- 6.8.8 Any unused interior brackets may be removed. There must be no remaining sharp edges.
- 6.8.9 Any unused under-hood brackets and plastic components that can be unbolted (not cut) may be removed.

6.9. Electronics/Electrical

- 6.9.1 Removal of wiring associated with a component that may be removed by these rules is permitted. Re-wiring of legal components is allowed as long as the modifications to the wiring do not alter or affect the original performance of the connected components.
- 6.9.2 All cars must have a minimum of two properly functioning OEM rear brake light assemblies. All other OEM light assemblies may be replaced with facsimiles, plates, covers, or mesh covered cooling duct openings as long as these maintain the stock external appearance. Replacements for recessed lights must also be recessed. Front turn signals and fog lights may be removed.
- 6.9.3 Electronic traction control devices are expressly prohibited. OEM electronic traction control devices must be removed or disabled.
- 6.9.4 Windshield wipers, wiper motor, arms, parts, windshield washer pump, washer reservoir, all lines and wiring may be removed.
- 6.9.5 Data Acquisition Systems are unrestricted. Telemetry is not allowed.
- 6.9.6 Radio Communication devices are allowed.
- 6.9.7 The battery may be relocated. The battery must be of the same type, group size (i.e. 24F), and voltage as originally equipped, or heavier, and may not be modified.
- 6.9.8 The alternator must be OEM stock and may be updated/backdated within cars of the same manufacturer on the eligible manufacturers/models list. The alternator must be charging according to the manufacturer's specifications.
- 6.9.9 Installation of non-OEM electrical devices to defeat OEM anti-theft circuitry is allowed. **Any such device must be external to the PCM and serve no other function.**
- 6.9.10 The PCM may be reprogrammed to eliminate anti-theft/PATS/VATS as well as to eliminate emissions controls such as rear O2 sensors, EGR, Evap, etc. Performance parameters of the tune such as ignition and fuel maps may not be altered.
- 6.9.11 The PCM may be relocated to inside the body for protection.

6.10 Plumbing

Plumbing, defined as hoses, hose ends, hard lines, associated fittings, and routing, is unrestricted provided it serves the same function. Filters for all fluids may be added or substituted.

6.11 Engine

- 6.11.1 Any 4.6 Ford, 5.0,(302 Ford or 305 GM), 5.7 liter LT1/LS1 GM V8 production engine, in OEM stock configuration unless otherwise stated in these rules, that was originally offered in an eligible model car is legal. Cobra R model engines (Ford) and LT4 (GM/Chevrolet) engines or engine components are prohibited. Additionally, early GM cars may run a late GM LS or LT engine and controlling electronics as long as they are in a configuration allowed within these rules.
- 6.11.2 Engine mounts may be substituted with aftermarket polyurethane or solid replacements that use the OEM mount locations and maintain the motor in the OEM location.
- 6.11.3 Aftermarket harmonic balancers meeting SFI 18-1 and factory balance are allowed.
- 6.11.4 Any valve springs, spring seats, retainers, keepers, shims, and locks may be used provided they are the same metal as OEM and are mounted to the OEM valves. Lash caps may only be used if present on the OEM setup.
- 6.11.5 GM cars may substitute engine blocks with OEM cast iron four bolt main bearing blocks.
- 6.11.6 Early GM 305 TPI cars may use GM L31 Vortec #12558060 or L30 #12552520/12558059 heads and Edelbrock 3817 TPI base manifolds.
- 6.11.7 Early GM 305 cars may use up to 1.6 ratio individual stud mounted roller rocker arms.
- 6.11.8 Ford 5.0 cars may use Explorer/Mountaineer GT40P heads and intake manifolds.
- 6.11.9 Ford 5.0 cars may use the Ford Racing E303 camshaft.

6.11.10 Ford 5.0 cars are allowed to be internally balanced by substituting an appropriate aftermarket crankshaft, flywheel, and balancer, as long as the combined weight of these three components is at least 73lbs, and the flywheel is made of steel. Recommended parts are Scat crank 4-302-3000-5090-2123I, Spec flywheel SF01S and ATI balancer 918921. Carbureted cars employing this modification must run an appropriate aftermarket RPM limiter set to no more than 6,200RPM.

6.12 Ford Spec Carbureted Engine Option

Any of the following unmodified aftermarket components (and only these components) may be substituted on a CMC legal Ford 5.0 liter (302ci) V8 long block to create a carbed, spec Ford engine:

1. Holley carburetor 600cfm-4bbl #4776
2. Edelbrock Performer or Performer RPM intake manifolds #2121, #7121, #7521
3. Ford Racing B303 camshaft
4. Ford OEM distributor (non-computer controlled)

6.13 GM Spec Carbureted Engine Option

Any of the following unmodified aftermarket components (and only these components) may be substituted on a CMC legal GM V8 long block to create a carbed, spec engine:

5.0 liter (305ci)

1. Holley carburetor 600cfm-4bbl #4776
2. Edelbrock Performer intake manifold #2101, #2104, #2116, #7116, #7516
3. Edelbrock Performer Cam kit #2102 or Comp Cams #12-238-2
4. GM L31 #12558060 or L30 #12552520/12558059 heads
5. GM OEM H.E.I. distributor (non-computer controlled)

5.7 liter (350ci)

1. Holley carburetor 600cfm-4bbl #4776
2. Edelbrock Performer intake manifold #2101, #2104, #2116, #7116, #7516
3. GM Camshaft #24502476
4. GM L31 #12558060 or L30 #12552520/12558059 heads
5. GM OEM H.E.I. distributor (non-computer controlled)

6.14 GM 5.3L LS Engine Option

GM cars may substitute the engine long block assembly with the 5.3L LS series LM7, L59, LM4, and L33 long block assembly from 1999-2007 GM trucks. The intake, exhaust manifolds, and all external accessories and electronics from the Late GM 5.7L LS cars must be retained. The OEM camshaft from the Late GM 5.7L LS1 cars may be used.

6.15 Engine Balancing / Rebuilding

Engine balancing is allowed. Lightening of parts beyond the minimum required to balance is prohibited. Boring/honing is allowed up to 0.060 over. Head/block milling is allowed but only as far as required to square/clean the surface area. Compression ratio shall be no higher than 10.0 to 1 for iron head engines and 11.0 to 1 for aluminum head engines.

6.16 Fasteners/Gaskets/Engine Bearings

Fasteners are unrestricted provided they serve the same function. Gaskets and engine bearings are unrestricted.

6.17 Lubrication

Oil Filters and lines may be replaced or added. Dry sump lubrication systems are prohibited. Any oil pump that fits in the OEM location is allowed.

6.17.1 An oil pressure accumulator such as a Canton Accusump or Moroso accumulator is allowed. Any oil lines that pass through the passenger compartment must be metal or metal braided and must be securely fastened and safely routed as per the NASA CCR.

6.17.2 Aftermarket wet sump oil pans, baffles, screens, and pickups are allowed.

6.18 Separators, Breathers, Catch/Overflow Tanks

6.18.1 Breathers, vents, separators, and catch/overflow tanks may not be mounted inside the passenger compartment.

6.18.2 Radiator overflow vent line must run into a tank of at least one U.S. quart capacity.

6.18.3 Engine, transmission, and rear axle may have vents or breathers substituted or added including venting to a remote tank.

6.18.4 The engine may not be vented to the exhaust or any other vacuum system other than the engine air intake.

6.19 Accessory Pulleys/Belts

All engine accessories must remain OEM stock unless stated elsewhere in these rules. Engine accessory mounting brackets may be substituted, removed, or modified from stock to allow **mounting of the power steering pump and alternator** removal of the air conditioning compressor and smog pump but changes may serve no other purpose. Engine accessory drive pulleys and belts may be replaced with any non-tooth drive belt and appropriate pulleys providing doing so does not boost horsepower or torque above the allowed maximum figures.

6.20 Smog Equipment

All smog equipment may be removed, including the catalytic converter(s). Any smog equipment not removed must either be disabled or left to function as originally intended by the manufacturer. All disconnected ports and holes must be sealed.

6.21 Injection/Induction

6.21.1 The jets, metering rods, needles, etc in the stock / spec carburetor may be changed to facilitate tuning.

6.21.2 The stock/spec carburetor choke assembly may be removed. Any carburetor heat shield/insulator/spacer up to 1" thick may be installed on carburetor cars to help prevent fuel boiling.

6.21.3 Injectors may be of any origin, but must have **the same must have the same meet OEM specifications rating** and use the OEM fuel rail. Early 305TPI cars may use 24lb injectors that use the OEM fuel rail.

6.21.4 All Cars may install a restrictor between the air filter and intake manifold to reduce horsepower and torque. The diameter and thickness of the restrictor plate orifice(s) shall be noted on the Dyno Sheet and must match at all times. Carbureted cars may install a mechanical throttle stop on the carburetor linkage for the same purpose. Throttle stop dimensions must be noted on the Dyno Sheet for inspection purposes and must match at all times.

6.21.5 Any air filter or air filter assembly may be fitted and OE assemblies may be modified. Air boxes and filters must reside inside the engine compartment or in the OEM stock location. Air filter installations intentionally designed to create, or that appear to create a ram air effect are not allowed, even if they were OEM stock. **A ram air intake shall be defined as one that sources its air from a location on the exterior of the car or the radiator ducting and is ducted and sealed from that source to the throttle body/carb. Ducting that has gaps or openings smaller than 5 square inches total will be considered sealed.**

6.22 Fuel System

6.22.1 A maximum of one fuel pump and one pickup are allowed with the following restrictions: Cars retaining the stock fuel tank may use any fuel pump that fits in the factory location.

Cars equipped with a fuel cell may use any fuel pump and mount it anywhere outside of the passenger compartment.

6.22.2 Fuel pressure may be adjusted by means of an adjustable fuel pressure regulator. Only one pressure regulator per car is allowed. For fuel-injected cars, the regulator must fit in the factory OEM location. It must be possible to test the fuel pressure using the factory fuel pressure test port.

6.22.3 Fuel coolers of any kind are prohibited.

6.22.4 The OEM fuel filler neck may be modified by removing the fill flap and ring.

6.23. Ignition

6.23.1 Any spark plugs, ignition wires, distributor cap, distributor rotor, and coils may be used.

6.23.2 Any rev limiting device may be used provided that is its only function.

6.23.3 Any initial timing may be used but no recurving of the distributor or timing map is permitted.

6.23.4 Ford 4.6 2V cars may use an external base timing adjuster such as Steeda #555-3410 as long as the adjuster serves no other purpose other than to adjust base timing and the timing can be verified visually.

6.23.5 All other ignition components and parts must be OEM stock or equivalent replacements and remain unaltered.

6.24 Exhaust

6.24.1 All cars must use OEM stock exhaust manifolds with the following exceptions:

Early GM 305 and Early Ford 5.0 cars may use shorty style headers

Ford 4.6 2V cars may use long tube headers.

6.24.2 OEM exhaust manifolds and headers may have a coating that is bonded to the parent material. This includes any paint or ceramic type coatings, but does not include header wraps.

6.24.3 Any suitable exhaust system may be used after the manifolds (or headers on cars that are allowed headers). The exhaust must exit behind the driver and be directed away from the car.

Mufflers may be required to meet sound regulations depending on track location.

6.25 Engine Cooling

6.25.1 Any radiator may be used provided it fits in the stock location and requires no major body or structure modifications to install.

6.25.2 Any engine driven water pump that fits in the unmodified OEM location is allowed.

6.25.3 Radiator fans, shrouding/ducting around, and mesh screens in front of the radiator may be added, removed, or modified. Thermostats are unrestricted. Air conditioning systems may be removed.

6.25.4 The heater core may be bypassed and/or the entire heater box assembly may be removed. This includes all hoses, lines, ducts, coils, and controls. Any resulting holes in the firewall must be plugged or covered adequately to maintain the integrity of the firewall. Tape is not an acceptable covering.

6.25.5 Oil and power steering coolers may be replaced or added. Coolers must be securely mounted forward of the firewall. All lines must be securely fastened and safely routed.

6.25.6 LT1 and LS1 powered GM cars may use modified OEM power steering pumps to lower power steering temperatures.

6.25.7 The only engine coolant allowed shall be water. Water additives such as Redline Water Wetter may be used.

6.26 Clutch/Flywheel

6.26.1 Any single disc clutch and pressure plate of OEM stock diameter may be used provided that it is bolted directly to the unmodified OEM stock flywheel and the pressure plate is made of the same material as OEM.

6.26.2 Any clutch actuating cable and linkage mechanisms or master and slave cylinders as applicable may be used.

6.27 Transmission

6.27.1 Any manual OEM stock five or six speed transmission that was originally offered in an eligible model car of the same manufacturer is allowed. Tremec 3550 (Tremec part 260 0682R or TCET1376 only), Tremec TKO, T56, and TR6060 transmissions are also allowed.

6.27.2 Transmission internals may be modified or substituted to aid in reliability, but the transmission must remain synchromesh with helical cut gears. Dog ring and straight cut gears designed to enable clutch-less shifting are not allowed.

6.27.3 All gears including reverse must be functional and able to be used to drive the car.

6.27.4 Only the following gear ratios are allowed in each transmission:

Transmission	Allowed Ratios					
	1st	2nd	3rd	4th	5th	6th
T45	3.37	1.99	1.33	1.00	Any	n/a
T5	2.95	1.94	1.34	1.00	Any	n/a
T5	3.35	1.93	1.29	1.00	Any	n/a
T5	3.35	1.99	1.33	1.00	Any	n/a
T5	3.50	2.14	1.36	1.00	Any	n/a
T5	4.03	2.37	1.46	1.00	Any	n/a
T5	3.97	2.34	1.46	1.00	Any	n/a
T56	2.66	1.78	1.30	1.00	Any	Any
T56	2.97	1.78	1.30	1.00	Any	Any
T56	2.97	2.07	1.43	1.00	Any	Any
TR 3650	3.38	2.00	1.32	1.00	Any	n/a
TR 3550	3.27	1.98	1.34	1.00	Any	n/a
TKO / TKOII / TKO500 / TKO600	3.27	1.98	1.34	1.00	Any	n/a
TKO / TKOII / TKO500 / TKO600	2.87	1.89	1.28	1.00	Any	n/a
TR 6060	2.97	1.78	1.30	1.00	Any	n/a
TR 6060	2.66	1.82	1.30	1.00	Any	n/a

6.27.5 Any shifter, shift linkage, and shifter knob may be used.

6.27.6 Transmission mounts and/or bushings may be changed from stock but the transmission must remain in the same location.

6.28 Drive Shaft

The OEM stock drive shaft, yokes, and universal joints may be substituted with any replacement of steel or aluminum construction.

6.29 Rear axles

6.29.1 Any OEM stock differential housing that was originally offered in an eligible model car is allowed. Updating/Backdating of OEM stock differential housings is allowed.

6.29.2 Both GM and Ford cars may also use a Ford 9", GM 12 bolt, or Dana 44 rear axle housing, but the housing must maintain both the exact OEM suspension pickup points and OEM rear end geometry as the originally equipped axle assembly. Any gear ratio equal to or numerically lower than 4.11 that fits the stock/alternate differential case without modification may be used. Differentials may be fully locked (welded) or use any commercially available mechanical limited slip.

6.29.3 Any gear ratio equal to or numerically lower than 4.11 that fits the stock/alternate differential case without modification may be used. Differentials may be fully locked (welded) or use any commercially available mechanical limited slip. Any commercially available replacement type steel or alloy steel axles may be used. Full floater axles are prohibited. Heavy-duty non-"C" Clip style axle

ends are allowed and recommended. Competitors should carefully select axle ends. Many of the "C" clip eliminator axle ends are designed for street or drag strip use only and cannot withstand the side loads associated with road racing.

~~6.29.4 Any commercially available replacement type steel or alloy steel axles may be used. Full floater axles are prohibited. Heavy-duty non-"C" Clip style axle ends are allowed and recommended. Competitors should carefully select axle ends. Many of the "C" clip eliminator axle ends are designed for street or drag strip use only and cannot withstand the side loads associated with road racing. Differentials or differential covers may have a drain plug added. Differential covers may be substituted.~~

~~6.29.5 Differentials or differential covers may have a drain plug added.~~

6.30 Wheel Studs

Wheel studs and lug nuts are unrestricted, but must be made of steel and no smaller in size than OEM stock.

6.31 Wheels/Tires

6.31.1 Wheels may be of any construction or material, must be 16 or 17 inch diameter, and must not be wider than 9.5 inches.

6.31.2 16 inch wheels must weigh 16.0lbs or more. 17 inch wheels must weigh 18.0lbs or more. One piece aluminum spacers welded to the wheel will be included in the total wheel weight. Detachable balancing weights will not be included in the total wheel weight..

6.31.3 Maximum tire size is 275/40R17 for all cars. The Toyo Proxes RR and Toyo Proxes RA1 are the only tires allowed.

6.31.4 Wheel spacers are allowed and wheels may have any offset.

6.32 Brakes and Front Hubs

6.32.1 Brake pads, linings, and fluid are unrestricted.

6.32.2 The brake master cylinder and brake booster must be OEM stock and unmodified. Any year SVO Mustang master cylinders/boosters are allowed for Early Ford cars.

6.32.3 A brake-proportioning valve may be used provided that it is an inline, pressure-limiting type.

6.32.4 Backing plates (dust shields) may be removed or modified. Air ducts may be fitted to the brakes, provided that they extend in a forward direction only and that no changes are made in the body/structure for their use. Liquid brake cooling is prohibited.

6.32.5 Parking brakes, mechanisms, and actuating components may be removed.

6.32.6 Rear caliper mounting brackets may be substituted.

6.32.7 Antilock braking systems (ABS) are prohibited. OEM stock ABS systems must be removed or disabled by unplugging the wiring harness from the ABS actuator unit.

6.32.8 Braking systems shall conform to the following specifications:

1. The one piece front or rear hub with rotor may be replaced with a separate hub and rotor or separate hub, rotor hat and rotor.
2. Hat material may be aluminum.
3. Rotors shall be cast iron only and may be vented, cross drilled or slotted.
4. Maximum rotor size for all cars is 13.1" diameter and 1.31" thickness.
5. Front calipers may be any single line, aluminum bodied, with four or fewer pistons, that is readily available to the public from a retail source for less than \$700 each. Modifications to the spindle/upright to substitute the OEM caliper are allowed provided their only purpose is to enable mounting of the alternate caliper.
6. The rear calipers may be updated/backdated within approved cars of the same manufacturer on the eligible manufacturers/models list with the additions listed below for Ford cars being allowed:
 - a. Unmodified 1984-1986 Mustang SVO rear caliper
 - b. Unmodified 1984-1987 Lincoln Mark 7 rear caliper

c. Unmodified PBR style 40mm single piston calipers used in Baer and Ford kits
 6.32.9 Late GM cars may substitute the OEM front hubs with aftermarket hub assemblies as long as there is no change to the location and geometry of the brake rotor/hat to hub mating face plane and the hub assembly weighs the same or more than the OEM units.

6.33 Suspension/Steering

6.33.1 Minimum ride height is 4.5", to be measured at the lowest point of the rocker panel, but not to include welded seams, floor pan "bumps", or fasteners.

6.33.2 Panhard bars:

1. Ford cars may add a panhard bar. The bar may be adjustable for length. One panhard bar mounting point may be height adjustable to allow for leveling of the bar, but the other mounting point must be of fixed height.
2. GM cars may substitute the OEM panhard bar. The bar may be adjustable for length. The passenger side mounting point must remain OEM stock. The driver side mounting point may be lowered, but only to the point where the panhard bar is parallel to the axle at ride height.

6.33.3 The rear control arms may be substituted with aftermarket control arms meeting length measurements specified in the table below +/- 0.125". Lengths specified are pivot center to center. Spring perches on the arms, if applicable, may allow adjustment of ride height. The control arms must bolt on using the OEM factory holes and no cutting, welding or other modifications may be made to the structure of the car or rear end housing to install these control arms.

Rear Control Arm Lengths	
Car	Length (+/- 0.125")
GM	19.25
Ford Lower	17.64
Ford Upper	9.25

6.33.4 Springs of any rate, OD, ID and free length may be used. Springs must install in the OEM stock unmodified location using the original system of attachment unless noted elsewhere in these rules.

6.33.5 Any spring spacers/shims may be used. The spacers may allow adjustment of the installed height of the spring without spring removal. The spring spacers/shims must install with the spring in the OEM stock location and no cutting, welding or other modifications may be made to the structure of the car or suspension arm/axle to install these spacers/shims.

6.33.6 Any non-remote reservoir shock absorbers, of any origin, that are readily available to the public from a retail source for less than \$1,000 a pair may be used provided they attach to the OEM stock unmodified mounting points and do not alter the stock geometry, with the exceptions outlined in 7.33.10 below.

6.33.7 Suspension bushing material is unrestricted.

6.33.8 All cars may adjust the camber and caster of the front wheels by the use of eccentric bushing at the control arm pivot points, by the use of eccentric bushings at the strut-to-bearing-carrier joint and/or by the use of slotted adjusting plates at the top mounting point. If slotted plates are used, they shall be located on the existing chassis structure and shall not serve as reinforcement for that structure. Some minor trimming of the chassis strut tower opening is allowed to provide for additional suspension adjustment. In lieu of caster / camber plates, late model GM cars may elongate the upper and lower control arm slots for purposes of increasing the caster and camber range.

6.33.9 Front caster and camber on all cars is open.

6.33.10 Maximum rear camber on all cars is 0.6 degrees negative.

6.33.11 Alternate outer steering tie rod ends that allow adjustment for bumpsteer may be installed as long as their installation does not require any welding, or cutting to the spindle or inner tie rod ends. Drilling the steering arm to accept an aftermarket bumpsteer kit is allowed, but no other modifications to the spindle are permitted.

6.33.12 Aftermarket steering shafts or shaft components, defined as the components connecting the steering rack/box to the steering column, may be used.

6.33.13 The sway bar(s) may be removed or any solid or hollow sway bar(s) that matches the OEM profile/contour and uses OEM bayonet style end links (i.e. a direct bolt in) and has an OD no bigger than as listed below may be used.

Car	Front Sway Bar Max OD	Rear Sway Bar Max OD
1982-1992 Early GM	36mm	24mm
1993-2002 Late GM	35mm	21mm
1979-1993 Ford	33mm	27mm
1994-2004 Ford	30mm	27mm

* Note: 1979-1993 Fords may modify the front sway bar mount to enable use of 1994-2004 sway bars.

6.33.14 Sway bar end links may be any length but must use OEM style ends

6.34 Suspension Mounting Point Reinforcements

All cars are allowed to reinforce or repair the front and rear lower and upper control arm, strut tower (if applicable) and transmission mount crossmember to body (GM only) attachment points within the following restrictions:

1. The attachment point must remain in the OEM Stock location and maintain the same geometry.
2. All additional reinforcement material or welding of existing material must be within 12" of the center of the mounting point.
3. 1979-2004 Ford cars may install the Wild Rides Racing upper and lower S-Box replacement kits but these must be installed so as to retain OEM suspension pickup point locations, which must be used.
4. None of the additional reinforcement may attach directly to the rollcage or rollcage mounting points.

7. Rules/Procedures

7.1 Power and Weight table

Cars competing in the CMC series must adhere to the table below for measured power and minimum weights. Horsepower and torque used to determine minimum weight must be the average of the three dyno runs, as recorded on the car's annual Dyno Spec Sheet.

Power & Weight Table 1									
Ford cars through 1993 subtract 150lbs from weights below									
Ford cars 1994 - 1998 subtract 100lbs from weights below									
Ford cars 1999 - 2004 using cast iron blocks subtract 100lbs from weights below									
Aluminum block LS cars add 50lbs to weights below									
Early GM cars with 305TPI engines add 5lbft to the Torque column values below									
		Torque							
		≤310	311	312	313	314	315	316	317
Horsepower	≤260	3250	3260	3270	3280	3290	3300	3325	3350
	261	3262	3272	3282	3292	3302	3312	3337	3362
	262	3275	3285	3295	3305	3315	3325	3350	3375
	263	3290	3300	3310	3320	3330	3340	3365	3390
	264	3305	3315	3325	3335	3345	3355	3380	3405
	265	3325	3335	3345	3355	3365	3375	3400	3425
	266	3340	3350	3360	3370	3380	3390	3415	3440
	267	3355	3365	3375	3385	3395	3405	3430	3455

7.2 Horsepower/Torque and Minimum Weight Decal

All cars must display horsepower, torque, and minimum weight on a power/weight decal on the windshield.

7.3 Minimum weight

Minimum weight is as measured immediately after a race, including driver. There is zero tolerance on the weight measured by the scales except as noted in the CCR 17.8.

7.4 Track Width

Cars are allowed a maximum track width as noted in the table below. Track width is measured "as raced" with driver and is measured at the outside edge of the tires. The track width measurement will be taken at a point three inches from the ground using two metal plates similar to the Longacre #7950 toe plates. The measurement used for compliance will be the average of the front of the tire and rear of the tire width measurements at the three inch height after accounting for the thickness of the plates. The plates will be placed flush against the tire and not perpendicular to the ground for the measurements.

Car	Maximum Track Width (inches)	
	Front	Rear
79-93 Ford	72.75	72.75
94-98 Ford	73.25	72.75
99-04 Ford	73.25	73.75
82-92 GM	74.00	74.00
93-02 GM	74.00	74.00

7.5 Dynamometer Certification

All participants who wish to compile season points must have a dynamometer certification report prior to the start of the race or make arrangements to have a dyno test performed immediately after the

race. The dynamometer certification report will consist of two parts: a completed CMC Dyno Spec Sheet and Dyno Sheet Readout Graphs. These forms must be kept with the car's logbook and be ready to present to any official. The CMC Dyno Spec Sheet includes instructions for performing the official dynamometer inspection, which must be followed in order for the dyno report to be valid.

7.6 Inspection and Testing

NASA tech inspectors and CMC Officials have the right to inspect anything in sight at any time the car is at the track. NASA tech inspectors and CMC Officials have the right to request disassembly or any other procedure required to verify car compliance with these rules including a dynamometer re-certification. CMC Officials may require that a CMC Official or designee be present for any dynamometer re-certification.

7.7 Tolerances

Unless otherwise specified, all published measurements infer a tolerance of +/- one-half of the last specified decimal place. All rounding will be done to the nearest decimal place that is specified in these rules. In a case where a measurement falls exactly on the halfway mark it shall be rounded up or down in favor of the competitor.

7.7.1 Fuel Pressure Tolerance shall be +/- 2psi for EFI cars. Carbureted cars are not subject to a fuel pressure tolerance.

7.7.2 Timing tolerance shall be +/- 1 degree.

7.8 Proof of Legality

It is the responsibility of the competitor to provide proof of legality of their car's modifications or components to CMC Officials.

7.9 Race Points:

Points shall be awarded as follows:

1st	100 points	6th	91 points
2nd	97 points	7th	90 points
3rd	95 points	8th	89 points
4th	93 points	9th	88 points
5th	92 points	10th	87 points

Points will continue in a descending order, subtracting one point for every position after the 10th. All cars that are a "Race Starter" shall be considered a "Race Finisher". Refer to CCR for Race Starter and Race Finisher definitions. Points from the lowest scoring 20% of the season's total number of races shall be dropped from each driver's total for purposes of calculating the season total. Rookie points will be awarded the same, except the lowest scoring 33% of the season's total number of races shall be dropped.

Disqualifications and suspensions due to driving penalties will result in zero points which may be dropped from the annual point's total. Disqualifications and suspensions due to technical non-compliance will result in zero points which may not be dropped from the annual point's total. Typically, a disqualification for a technical non-compliance discovered during post-race tech inspection will only apply to that one race.

8. Qualifying Points

The driver who is awarded the top qualifying position for each qualifying session shall be given an additional point for each pole position earned added to their season total points after applying drops.

Class/Series Directors, Website/Social Media

Any questions concerning the CMC class should be directed to the CMC Board of Directors or your region's Regional Coordinator.

<u>CMC Series Directors</u>	
<p>Al Fernandez CMC National Series Director 925-408-7303 (cell), 936-321-0331 (home) charger@consolidated.net</p>	
<p>Dustin Mozader Rocky Mountain 719-648-0594 (cell) supercharged111@gmail.com</p>	<p>Bob Denton Central 309-265-1954 (cell) Bobden10@gmail.com</p>
<p>Bob Denton Great Lakes 614-746-7746 309-265-1954 (cell) CMC@nasagreatlakes.com Bobden10@gmail.com</p>	<p>Michael Mosty Texas 972-897-1424 (cell) michaelmosty@hotmail.com</p>
<p>Kent Lydic Mid Atlantic 703-509-0401 (any time) Dircmceast@aol.com</p>	<p>Ed McGuire South East 704-562-4910 (cell) Ed_McGuire@hotmail.com</p>
<p>AJ Hartman North East 609-217-8079 AJ@ajhartmanracing.com</p>	<p>Patrick Wehmeyer Florida 813-361-1688 Patrick.Wehmeyer@verizon.net</p>
	<p>Al Watson Al National Chief Director and Advisor to CMC 908-447-5788 Al_streetmotorsports@hotmail.com</p>

Additional CMC information, including annual schedule, points race and a public message board may also be found on the CMC Web page: www.nasaponycars.com

9 Appendix

See below for the official CMC Dyno Test Data and Vehicle Specification form.

**American Iron & Camaro Mustang Challenge
2019 Dyno Test Data and Vehicle Specification Sheet**

Owner: _____ Car#: _____ Class: _____ Engine CID: _____

NASA Log Book # _____ Vehicle Year: _____ Make and Model: _____

Items to be certified (if applicable):

1. Ignition Timing: _____ deg. adv. @ idle. _____ Not Applicable
2. Idle RPM: _____
3. Fuel Pressure: _____ psi. (Fuel Injected only)
4. Carb Jet or Rod sizes: _____ Primary _____ Secondary _____ Not Applicable
5. Intake or Exhaust restrictor size, # of orifices, diameters, thickness: _____ Not Applicable or length:

Carburetor throttle stop: _____ Not Applicable

6. Exhaust Configuration (in addition to exhaust restrictor itemized above if used):
 - a. Primary Header pipe size: _____ inches or check if stock _____
(Check all that apply)
 - b. ___ Single ___ Dual c. ___ X-pipe ___ H-pipe ___ Y-pipe
 - d. Muffler Type: _____ Inlet size: _____ inches
 - e. Tail Pipe location: _____ Outlet size: _____ inches
7. List any additional modifications and or parts to bring vehicle to recorded power listed in section 12. (Use reverse side if needed):

8. Altitude of dyno shop: _____ ft
9. Rear tire pressure set at 30lbs before run? ___ Yes
10. Hood open for dyno pull? ___ Yes
11. Dynojet set to correct to SAE J1349, smoothing 5 ___ Yes
12. Reading between 165-210 degree water temp : _____ HP _____ Torque
Reading between 165-210 degree water temp: _____ HP _____ Torque
Reading between 165-210 degree water temp: _____ HP _____ Torque

Average of three runs above: _____ **HP** _____ **Torque**

Minimum Weight as per class rules: _____ **Pounds**

Owner's Signature _____ Date _____

Dyno Operator's signature _____ Date _____

Name

Name

AI/CMC Dynamometer Inspection Procedures

1. Only dyno runs on DynoJet brand dynamometers are acceptable.
2. One dyno report may be performed and used for the entire season provided that:
 - a. It is performed after the last event of the prior season and before the first race entered for the season.
 - b. No performance modifications are made to the car.
3. If a competitor is unable to complete a dyno inspection prior to competition, NASA may seal the car's hood and computer access ports to enable a post-race weekend inspection. Should the car fail such post-race inspection, those race results will be changed to Fun Run.
4. NASA may choose to require a dyno re-certification at any time and may seal a car's hood and computer access ports during a race weekend to enable performing such a re-certification at a convenient time after an event. Should the car fail a NASA required re-certification, disqualification will generally be limited to one race.
5. All dyno readings must be corrected to SAE J1349 Rev JUN90 (29.23 in/hg, 77F, zero humidity) and the dyno's smoothing function must be set to 5
6. Car must be in "ready to race" configuration with regards to engine and drivetrain.
 - a. American Iron Class: All engine or drivetrain components that are *adjustable and affect power* (carb jets, timing, restrictors, etc.) must be explicitly allowed by the vehicle's class rules, must be written down in section 1 - 6 of the inspection sheet, and must match at all times.
 - b. Camaro Mustang Challenge Class: All engine or drivetrain components that are *not stock and affect power or are adjustable* (restrictors, air intakes, timing, etc.) must be explicitly allowed by the vehicle's class rules, must be written down in section 1 - 6 of the inspection sheet, and must match at all times.
7. Rear tires must be set to 30psi.
8. Hood shall be open during dyno test runs.
9. Electric engine fans and or external cooling fans may be used.
10. Dyno pulls will be made in 4th gear or at a 1:1 ratio.
11. Altitude of the dyno shop must be recorded. Dyno runs made at locations with elevation greater than 1,500 feet higher than the track will not count as being valid at that track. Class Officials may decide to waive this requirement for certain circumstances. **Check with your local class director ahead of time.**
12. 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 clearly beyond max horsepower.
13. Dyno runs shall be made with water temperature in the normal operating range of 165F-210F and drivetrain fluids up to a normal running temperature. (A "practice pull" is highly recommended prior to 3 consecutive runs to ensure proper drivetrain temperatures.) Water temperature may be verified using external temperature measurements such as an infrared temp gun at a thermostat housing or a metal tube section of the line returning water to the radiator.
14. The peak horsepower and torque of each run will be noted on the inspection sheet.
15. The average of the three consecutive runs will be calculated and noted on the inspection sheet. This average horsepower and torque number is what must be used to determine the vehicle's required minimum weight, using the car's specific class weight rules.
16. One dyno certification may be valid for an entire race season as long as no performance modifications are made to the car.
17. All HP & TQ results will be rounded to whole numbers. In the case where the measurement falls exactly on the halfway point (.50), it shall be rounded down in favor of the competitor i.e.- 260.50 = 260 and 260.51 = 261