WESTERN CANADA MOTORSPORT ASSOCIATION
TECHNICAL REGULATIONS - RACE
2014

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FOREWORD

Auto racing is a dangerous sport.

These regulations are intended to assist in the conduct of Competitions and to further general safety. They are a guide and in no way guarantee against injury or death to participants, spectators or others.

No express or implied warranties of safety or fitness for a particular purpose are intended or result from the publication or compliance with these or any other official regulations. **Entering a WCMA event constitutes an agreement, without reservation, by any person participating in such event in any capacity, that he or she has read and understands the within Regulations and shall at all times conduct himself or herself in accordance with them.**

Affiliated Clubs may adopt these Regulations and the WCMA Sporting Regulations - Race for use within WCMA sanctioned competitions. WCMA license holders and WCMA officials may print copies of these Regulations for their own use.

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These regulations detail preparation and performance rules for WCMA racing classes.

Headings used in these regulations are not to be read into the regulations.

WCMA reserves the right to alter these regulations at any time.

WCMA bulletins become part of these regulations.

These regulations have been prepared in English text which shall prevail in terms of meaning and intent.

These Regulations are effective May 1, 2014

Should clarification be required on these regulations, please contact the WCMA Race Technical Committee through the WCMA Race Director.

All competitors must have a copy of the current rules in their possession.

CHAMPIONSHIP CLASSES

The WCMA recognizes the following classes, which are defined in the following regulations. Classes with an asterisk are WCMA Championship classes.

Class Abbreviation	Definition
F1600	Formula Ford 1600 *
FC	Formula Continental *
FL	Formula Libre
FV	Formula Vee *
GT-1	Grand Touring 1 *
GT-2	Grand Touring 2 *
GT-3	Grand Touring 3 *
GT-4	Grand Touring 4 *
GT-5	Grand Touring 5 *
GT-S	Grand Touring Special *
IT1	Improved Touring 1 *
IT2	Improved Touring 2 *
IT3	Improved Touring 3 *
IT-O	Improved Touring – Over *
IT-J	
SM	Spec Miata
ST-U	Sport Touring Under *
ST-O	Sport Touring Over *
CC	Challenge Cars *
SR	Sports Racing Cars*
Legend	Thunder Roadster & Legend Cars *
ICE RACING	Ice Racing

SECTION 1 - GT REGULATIONS

1 - Purpose

GT vehicles are defined as race vehicles based on a series production closed wheel automobile. The purpose of the GT class in WCMA racing is to allow competitors an opportunity to race a production-based vehicle of their choice in a fair and competitive fashion. The GT class allows the maximum amount of preparation to a production-based vehicle.

a) These rules specify requirements for five classes: GT-1, GT-2, GT-3, GT-4, and GT-5. Production based vehicles, which meet the WCMA safety requirements, but not the preparation rules may be raced in the GT-S class.
b) All vehicles must comply with the relevant regulations contained in this WCMA rulebook as well as any applicable regulations which may be in the current ASN Sporting Code. Only automobiles which can be proven to be based on a series production automobile are eligible. Responsibility for this proof rests with the competitor or entrant.
c) GT vehicles are classified for racing purposes in groups of similar performance. The groups will be based on a weight to displacement formula.

2 - Frame

a) All GT vehicles must be fitted with a roll cage as described in the Appendix "A" in this rulebook. Tube frame vehicles are permitted. Production chassis, frame or subframe components may be lightened, reinforced or replaced.
b) The original roof, windshield pillars, and angle of the windshield must be maintained. Proof of conformity to these requirements is the responsibility of the competitor or entrant. Published specifications such as those in manufacturer annuals, brochures, road tests, etc. may be used as proof.

3 - Track and Wheelbase

a) All vehicles must conform to the production wheelbase. The wheelbase may not be relocated fore or aft.
b) Vehicles must conform to the following maximum track dimensions:

Class	Maximum Track	(Front and Rear)
GT-1	178 cm	177.80 cm (70.0")
GT-2	163 cm	162.56 cm (64.0")
GT-3	153 cm	152.40 cm (60.0")
GT-4	153 cm	152.40 cm (60.0")
GT-5	142 cm	142.24 cm (56.0")

4 - Floors and Firewalls

a) The firewall must completely separate the driver/passenger compartment from the engine compartment. The firewall and/or floor may be replaced with aluminum alloy or steel. Firewalls may be modified or notched for installing headers, engines, or induction systems. The firewall must extend from the floor to the base of the windshield and across the full width of the competitor's compartment (from door skin to door skin).
b) The production vehicle's floor may be replaced by a floor of aluminum or steel. If replaced, the floor must be flat. A portion of the floor may be raised up to 25 cm, or a secondary floor installed

at that level, to accommodate exhaust system installation only. The floor must extend from the firewall to the rearmost point of the competitor's seat as a minimum. The floor may not extend forward of the firewall or aft of the rear wheel opening at its forward-most point.

c) Ballast may be added but must be securely mounted within the coachwork in such a fashion that a tool is required for removal of ballast.

5 - Body Panels

The intent of the following sections is to permit the installation of safety and performance equipment while maintaining recognizable external features of the production vehicle. The external shape of the body may not be altered, except as described in the following sections.

a) Body parts of an alternate material may be substituted for the component parts of the body work, i.e. hood, doors, fenders, rear deck lid, rocker panels, etc.
b) Standard grille, window and door openings must be retained. A reasonable facsimile may be used instead of the stock grille.
c) Bumpers may be removed providing all projecting hardware is removed except when it/they are an integral part of the coachwork, in which case it/they may be replaced with replicas of an alternate material.
d) Doors may be pinned, but not bolted, to prevent their opening in case of an accident. If doors are pinned this must be clearly indicated below the window opening. Standard door hinges and latch mechanisms may be removed, but the doors must be capable of being opened or removed. Flammable interior door panels must be removed and may be replaced with metal substitutes. Door window slots may be covered.
e) Production hood and deck lid latches must be removed. The hood must be secured by at least two pins at the corners opposite to the hinged end. The deck lid must be secured by at least two pins or straps at the corners opposite the hinged end. Hood and deck lid hinges may be removed and replaced with additional pins or straps.
f) The contour of the fenders may be changed for tire clearance provided the shape (in horizontal projection) is the same as the original and does not confuse the identity of the vehicle. The fenders and/or flares must extend sideways so as to cover the tire at its highest point. Fenders may be vented.
g) Flush air intakes or vents may be installed on the fenders, hood, deck lid, or side windows as required. Projecting air scoops may not be installed unless the production vehicle was so equipped.
h) Removable and/or openable body panels must fit flush with the surrounding bodywork (i.e. rearward facing hoods, windows, or decklids may not be propped partially open to obtain aerodynamic advantage).

6 - Windows

a) All cars may use a standard safety glass windshield, mounted in the stock location and at the stock angle. In addition to other methods of attachment, all windshields must have retaining safety clips. Three (3) metal clips 7.62 cm x 2.54 cm x 3.2 mm (3" x 1" x 0.125") must be bolted or riveted to the body at the top of the windshield. Two (2) clips (same dimension) must be bolted or riveted to the cowl and extend over the bottom edge of the windshield. Clips must be spaced at least 30 cm apart. Polycarbonate windshields such as Lexan are allowed. Alternate windshields must be of 6mm minimum thickness. Alternate material windshields must be identical in size and curvature to the original glass component. Alternate material windshields must have in addition, three (3) inner supports to prevent the windshield from collapsing inward. These supports must be 0.75” by .125” minimum straps of aluminum. Spacing between these inner supports must be eight (8) inches minimum.
b) Removal of driver and passenger door window glass is recommended. Refer to Appendix 5.4 for window net requirements.

c) The rear quarter, rear side, and rear windows may be replaced with 3.0 mm (0.125") minimum thickness clear polycarbonate material. Replacement windows must retain the same shape, size, and approximate location as the original glass.
d) Windows may be flush mounted with the exterior of the coachwork. Window winding mechanisms, trim, molding, etc. may be removed.
e) Rear windows must be secured with two straps bolted or riveted to the body both above and below the rear glass. These straps must be a minimum of 2.54 cm wide X 3.2 mm (1" x 0.125") thick, and must be made of metal.
f) On GT1 vehicles only, three (3) 2.54 cm x 3.175 mm (1" x 0.125") strips of steel or aluminum alloy with equivalent tensile strength shall be installed behind the windshield to support it from collapsing inwards in the event of damage. These strips must be fastened to the roof panel or front roll bar hoop at the upper end, and to the cowl at the lower end. The strip nearest the competitor's position must be within 5.08 cm (2") of the vehicle centre line.
g) Vehicles with targa roofs and/or convertible tops may remove any or all glass panels and window frames.
h) All rear windows and/or hatchbacks and deck lids must be completely closed. Ventilation holes in the rear windows to the competitor/passenger compartment are not permitted.

7 - Interior

a) All flammable material must be removed from the interior of the vehicle. This includes rear seat backrests and cushions, carpets, door panels, kick panels, headliners, insulation, etc. The stock dashboard and/or instrument panel may be retained.
b) Any components of the roll cage that the driver may come in contact with should be padded.
c) A window net as per Appendix 5-4 must be fitted.

8 - Aerodynamic Devices

a) Rear spoilers are permitted providing that they comply with the following:
    i. a production rear spoiler that is standard for that model or readily available through aftermarket channels, or:
    ii. a lip type spoiler continuous with the deck lid fitted rearwards of the rear window, no wider than the body and bumper excluding fender flares, no further rearwards than the end of the body and bumper, no side panels or fences. The maximum height of this spoiler is 20.32 cm (8").
b) Rear wings, if fitted, must either be standard or factory optional equipment for the vehicle, or a rear wing which meets SCCA GT specifications.
c) A front spoiler may be fitted. It shall not protrude beyond the overall outline of the vehicle as viewed from above, if a bumper were fitted, or aft of the forward most part of the front fender opening. The spoiler shall not cover the normal grille opening at the front of the vehicle.
d) Openings in the front of the vehicle are permitted for the purpose of ducting air to the brakes, radiator or oil cooler(s), provided these openings do not confuse the identity of the vehicle.
e) A front splitter which meets SCCA GT specifications may be installed.

9 - Bulkheads

a) There must be a bulkhead separating the driver/passenger compartment from the compartment containing the fuel tank/cell, and a bulkhead separating the driver/passenger compartment from the engine. Bulkheads must be made of metal.
b) Such a bulkhead must be added if the standard vehicle has none (example, hatchback vehicles, and tube frame vehicles).
c) Bulkheads which extend from the floor to the roof behind the competitor are prohibited.

10 - Lights

a) Headlights, parking and/or signal lights may be removed. Any remaining glass lenses must be taped.
b) If these lights are removed, the openings must be covered with wire mesh screen or panels made of metal, fibreglass, or sheet plastic.
c) Protruding side marker lights must be removed, and the openings covered.
d) The vehicle must retain functional tail lights and brake lights. These must be mounted in original taillight assemblies. The tail lights must be at least 8 W per side; the brake lights at least 23 W per side. The brake lights must be enabled by the brake pedal only.
e) Whenever the track surface is wet, thereby causing spray, all cars on the track shall turn on their tail/rain lights. The brake lights must continue to be functional whenever the tail/rain lights are used. The tail/rain lights must be dimmer than the brake lights when they come on, unless amber turn signal lamps are wired as rain lights.
f) In the case of pop-up headlights, the entire assembly may be removed and the opening covered with a plate made of metal or alternate material.

11 - Front and Rear Suspension

a) All front engine GT vehicles must use McPherson strut or double A-arm suspension.
b) A-arm front suspensions must have the shocks attached to the outboard end of an upper or lower control arm.
c) Rear suspensions may not be converted to independent if the production vehicle was not so equipped. Front wheel drive vehicles which have been converted to rear wheel drive, either production based or tube frame, must use a beam (live) rear axle.
d) Any or all suspension components, including mounting points, may be reinforced, modified or replaced. If suspension components extend into the driver/passenger compartment, the openings must be completely sealed off by metal panels.
e) Suspension springs and shock absorbers may be replaced with others of unrestricted origin or design, but rocker arm or pushrod actuation of suspension springs or shock absorbers is prohibited.
f) Spherical rod ends must be mounted in double shear unless it is absolutely impossible to do so.
g) The minimum ride height as measured rearward of the front tire opening is 6.35 cm (2.5"). Components under the vehicle should be mounted such that they will not drag in the event of a flat.

12 - Steering

a) Steering arms, pitman arms and steering linkage component parts may be modified, reinforced or substituted. The steering system may be changed and/or relocated. The use of a collapsible steering column is highly recommended.
b) Modification or substitution of hubs, bearings, spindles, axle shafts, universal joints, flex joints and CV joints is permitted.

13 - Wheels and Tires

a) Alternate wheels of any type may be used providing that they are of metal construction, and that the track limits are not exceeded. Rim widths must be the same on the same axle. Maximum wheel widths, front and rear, are as follows:

Class	**Maximum Wheel Width**
GT-1	30.48 cm (12")

GT-2	25.40 cm (10")
GT-3 **thru GT-5**	**See text below**

For GT-3, GT-4 and GT-5 any diameter or wheel width is permitted. Inflated tire installed on wheel shall have a measured section width no larger than 10.5 inches (267 mm) including wheel lip. The measurement will be an actual measurement not the advertised tire width (e.g. lay wheel/tire assembly on floor with a straight edge to take measurement.)

b) Tires may be of a type used specifically for racing, or a DOT approved passenger vehicle tire with an appropriate speed rating that exceeds the potential speeds of their vehicle.

14 - Engine Block, Crankshaft and Pistons

Any modifications listed in this section may be performed.

a) Any commercially available cylinder block may be used. An aluminum block may not be used to replace a cast-iron block unless an aluminum block was available in the production engine.
b) Other than the above limitation, modification or replacement of block, crankshaft, and reciprocating components are unrestricted. Any displacement increase due to reboring or stroking will require recalculation of the vehicle minimum racing weight.

15 - Valve Train and Cylinder Head(s)

Valve train is defined as any component involved in opening and closing the valves.

a) The number of valves and their location in the head must remain the same as in the production head. The valves must be mechanically actuated.
b) Other than the above restrictions, the valve train components are unrestricted.
c) Any cylinder heads are permitted providing they may be fitted to the engine block, without change to the engine block.
d) The compression ratio may be altered by machining, using any head gasket, or elimination of head gaskets.

16 - Rotary Engines

Rotary engines may be modified as follows:

a) The eccentric shaft may be replaced with another of the same basic material, but no changes in eccentricity or journal dimensions are permitted.
b) The rotor is unrestricted, provided the number of lobes remains unchanged.
c) The capacity of the working chambers of the engine may not be changed.
d) The rotor housing may be modified.

17 - Induction and Exhaust

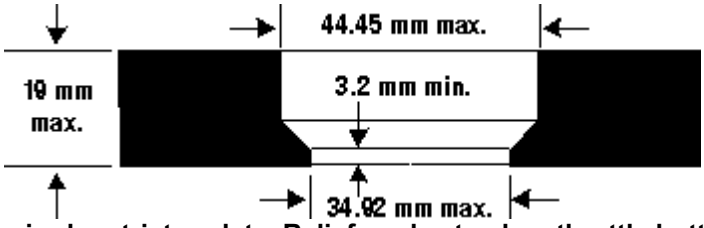
a) Induction systems for the various GT classes are allowed as follows:

Class	**Restricted Induction**
GT-1 over 6L (366 cu.in.)	Holley 4150 with restrictor plate
GT-1 under 6L (366 cu.in.)	Holley 4150 (max. throttle bore: 1 11/16
GT-2	Multiple carbs, one venturi per cylinder

GT-3	Multiple carbs, one venturi per cylinder
GT-4	Multiple carbs, one venturi per cylinder
GT-5	Multiple carbs, one venturi per cylinder

b) Alternate induction systems (e.g. fuel injection) may be fitted to any engine but a displacement factor of 1.1 for GT-1 vehicles, and a factor of 1.05 for GT-2 through GT-5 vehicles, will be applied in calculating the vehicle's minimum weight. Slide valve or annular discharge carburetors are also classified as alternate induction systems.

c) The GT-1 restrictor plate is to consist of a plate of aluminum or steel of maximum thickness of 19.0 mm (0.75") with four holes machined directly below each throttle bore. These holes must have a maximum diameter of 34.92 mm (1.375") for at least 3.2 mm (0.125") of the length of the hole, and a maximum diameter of 44.45 mm (1.75") for the remainder of the hole length. See the figure below for details.



Cross section of required restrictor plate. Relief angles to clear throttle butterflies unrestricted.

d) The intake manifold must be able to be attached to the cylinder head without modification of the cylinder head. No portion of the intake manifold may extend into portions of the cylinder head.

e) Any air filter may be used, or the air filter may be completely removed.

f) Any linkage may be used between the throttle and accelerator pedal, provided a minimum of two throttle return springs are used.

g) Mass produced OEM fuel injection is considered as restricted induction.

h) Any exhaust manifold or header may be used. Any muffler may be used. The maximum permissible noise level as measured 16 m (50 feet) from the side of the track surface is 108 dBA, subject to local track regulations.

i) The exhaust can be recessed into the floor and lower rocker panel. All portions of the exhaust must be shielded by metal bulkheads from the driver/passenger compartment. The exhaust must exit behind the competitor's position or at a point rearward of the centre of the wheelbase. Side exhausts must exit less than 17.78 cm (7") from the lower edge of the rocker panel.

18 - Fuel System

a) Fuel pumps and plumbing are unrestricted.

b) Fuel pumps may not be mounted in the driver/passenger compartment. Fuel lines passing through the driver/passenger compartment must be metal line, or metal braided line, or be completely enclosed by a supplemental metal cover.

c) **The use of a fuel cell is required unless the stock fuel tank is located between the axle centerlines and within the main chassis structure (i.e. frame rails, etc.). This is applicable to unibody cars with stock tank locations only. All other cars including tube frame construction cars must have SCCA/FT3 spec fuel cells.** This fuel cell may have a maximum capacity of 120 litres (26.40 Imperial gallons). The fuel cell bladder must be completely contained within a metal container constructed of at least 20 gauge steel or 0.149 cm (0.059") aluminum. No part of the fuel cell shall be closer than 15 cm to the ground unless contained within the basic structural frame rails of the vehicle forward of the rear axle. The fuel cell shall be located in approximately the same location as in the production vehicle or behind the rear axle, but not within the driver/passenger compartment. For vehicles where these requirements conflict with the production tank location, a specific variance may be granted.

d) The fuel tank cap must be non-venting and must not protrude from the bodywork. All fuel tank vents must terminate away from the body and incorporate check valves to prevent fuel spillage.

19 - Cooling Systems

a) The cooling system components and their location are unrestricted. Cooling system components include the drive mechanism.

20 - Ignition

a) The ignition system is unrestricted.

21 - Oiling System

a) Oil pans and pickups are unrestricted. Any type of oil pump may be used, provided that it is mechanically driven. Oil reservoirs must be located within the coachwork, and must be located so that in case of spillage, leakage or tank failure, oil cannot reach the driver. Mechanical pressure accumulators are permitted. A mechanical pressure accumulator should be shielded so that engine oil or spray cannot reach the competitor in the event of a tank rupture or leak.
b) Oil coolers are permitted provided that they are mounted in or under the coachwork, but not in the driver/passenger compartment.

22 - Engine or Cylinder Head Substitution

a) Engines may be substituted for ones of alternate displacement, or cylinder head configuration, provided that the substituted engine is of the same manufacturer and number of cylinders. By example, any Nissan four-cylinder engine may be used in a vehicle, which originally was equipped with a Nissan four cylinder engine. Any increase or decrease in displacement, or change in cylinder head configuration will require recalculation of the minimum racing weight. North American vehicles competing in GT-1, equipped with a pushrod V-6 or V-8 engine may substitute an engine of the same configuration but with a different number of cylinders.
b) Final discretion on engine substitution eligibility rests with the WCMA Race Technical Committee.

23 - Engine Location

a) Engine mounts are unrestricted. Front engine, rear drive vehicles may relocate the engine in a rearward direction such that the forward-most spark plug(s) intersect the front axle centre line in the vertical plane. A front engine vehicle is defined as one where the forward-most spark plug(s) are located in a vertical plane ahead of the front axle centre line.
b) The axis of crankshaft rotation may be changed. Transverse engine front wheel drive vehicles may be converted to rear drive under this rule.

24 - Starter

a) The engine must be equipped with an onboard electric starter.
b) Any electric starter may be used. The main starter cable terminal must be securely insulated.

25 - Transmission, Rear Axle and Drive Shafts

a) Any transmission or gear ratios may be used, provided that the transmission is installed in the production location. In the case of a transverse engine front drive vehicle converted to rear drive, the transmission must be mounted directly onto the rear of the engine.

b) Clutches, flywheels, and clutch linkages are unrestricted. An approved scattershield is required if the plane of rotation of the flywheel/clutch assembly intersects any portion of the driver's position. The scattershield must be made of one of the following materials:
    i. 3.2 mm SAE 4130 alloy steel plate
    ii. 6.3 mm mild steel plate
    iii. 6.3 mm aluminum alloy plate (not cast aluminum)
    iv. NHRA or SEMA approved flexible shield
c) Clutch linkages are unrestricted, provided that they remain operated by a foot pedal. If a driver is disabled, then the clutch linkage may be operated by a hand control.
d) The rear axle tube may be modified or replaced. Any final drive housing, gear ratios, limited slip or locked differential may be used. Final drive units which permit ratio changes while the vehicle is in motion are prohibited.
e) Drive shafts are unrestricted. Two drive shaft safety hoops must be fitted to front engine, rear drive vehicles. These hoops shall be located within 30 cm (12") of the universal joints on the ends of the drive shaft, and must be constructed of at least 6.35 cm x 2.54 cm (0.25" x 1.0") steel material. The hoops must completely encircle the drive shaft. A section of each hoop may be made removable to facilitate driveshaft removal; if this is done, the removable section must be attached to the permanent section by a minimum of two 0.952 cm (0.375") grade 8 or higher bolts. The drive shaft hoops must be securely attached to the frame or driveshaft tunnel.

26 - Brakes

a) All vehicles must be equipped with dual action master cylinders and a dual circuit braking system which permits effective braking on at least two wheels in the event of a leak in one circuit.
b) The use of any dual action master cylinder and/or pressure equalizing device is permitted. Brake lines may be relocated and shielded. Any suitable brake lines may be used. The use of braided-steel/Teflon lined flexible hose to replace flexible rubber hose is highly recommended and may be required in the future.
c) Any brake cooling devices may be used. Ventilation openings may be made in the body work to accommodate cooling ducts. Brake backing plates may be modified or removed.
d) Brake discs, calipers and/or drums, wheel cylinders, shoes and pads are unrestricted.
e) The handbrake and related operating mechanism may be removed.

27 - Safety Kill Switch

a) A safety kill switch must be fitted. It must disable all of the electrical systems on the vehicle directly, i.e. solenoids may not be used. If the kill switch does not disable the main starter cable, the starter cable must be fitted with a fusible link. This fusible link must not be installed near the engine compartment or fuel cell. The safety kill switch must be mounted on the cowl at the base of the windshield on the driver's side. Its location must be marked clearly (using a red spark on a blue triangle with a white border), and its operation must be obvious. If the driver cannot reach this switch while in the normal driver's position, a second switch with identical function must be fitted in the driver/passenger compartment such that the driver can operate the switch while strapped into the safety harness.

28 - General

a) An external boosting system to assist the vehicle's electrical system may be installed, provided that it cannot be accidentally shorted.
b) Alternators may be removed or substituted.

29 - Miscellaneous

a) The battery may be relocated. If the battery is relocated it must be enclosed in a ventilated and insulated box, and the battery must be securely attached to the vehicle.
b) It is strongly recommended that the vehicle be equipped with a towing eye or strap at the front and rear. Such a towing eye should not protrude dangerously from the vehicle.
c) All vehicles must comply with the current WCMA requirements listed in the Appendices 1, 3, 4, and Appendix 5

30 - Vehicle Classification

There are five GT classes. The classes are grouped according to engine size and type, as follows:

Class	Engine Displacement	Class Weight Factor (CF)
GT-1	2551 cc to 6000 cc	0.53 lb/cc
GT-2	2051 cc to 2550 cc	0.90 lb/cc
GT-3	1551 cc to 2050 cc	1.05 lb/cc
GT-4	1190 cc to 1550 cc	1.10 lb/cc
GT-5	Up to 1190 cc	1.20 lb/cc

a) For the purpose of classification, "Engine Displacement" is defined as the displacement of the specific engine currently installed in the competitor's vehicle, multiplied by all applicable displacement factors. All applicable displacement factors will be multiplied together to give the overall displacement factor for the competitor's particular vehicle. The overall displacement factor is multiplied by the displacement of the specific engine currently installed in the competitor's vehicle to give an adjusted engine displacement. This adjusted engine displacement is used to determine vehicle classification according to the class table.
The vehicle minimum race weight shall be calculated as follows:

Minimum weight = Displacement(cc) x DF x CF + 180 lb.
DF = displacement factor.
CF = class factor.

b) This displacement is defined as the displacement (swept volume) of the specific engine currently installed in the competitor's vehicle. If the engine is not an OEM installation, the vehicle race weight must be adjusted to account for any change in displacement, induction or valve train.
c) DF (displacement factor) is defined as the product of all applicable displacement factors listed below, multiplied together.
d) The vehicles will be weighed in drivable condition, i.e. with some fuel, oil and other fluids aboard and including the driver of the vehicle. It is expected that vehicles will generally be weighed at the termination of a track session, in immediate post-race condition.
e) The 180 lbs does not specifically represent the driver or any other particular component of the vehicle.
f) Diesel powered cars are permitted.

Examples:

1997 Toyota Corolla with a 1588 cc 2-valve per cylinder engine:
Engine Displacement = 1588 cc x 0.85 = 1350 cc → *Eligible for GT4*
Minimum Weight (including driver) = 1588 x 0.85 X 1.10 + 180 = 1664 lbs.

1991 Olds Cutlass with a 6000 cc 2-valve per cylinder engine:
Engine Displacement = 6000 cc x 0.85 = 5100 cc → *Eligible for GT1*
Minimum Weight (including driver) = 6000 x 0.85 x 0.53 + 180 = 2883 lbs.

1983 RX-7 with a fuel injected, bridge ported, 12A Wankel engine:
Engine Displacement = 1146 cc x 1.05 x 1.55 = 1865 cc → *Eligible for GT3*
Minimum Weight (including driver) = 1146 x 1.05 x 1.55 x 1.05 + 180 = 2138 lbs.

Displacement Factors

Displacement factors are used to roughly equalize the vehicle power to weight ratio achievable with different engine configurations and induction systems. The factors are as follows:

Induction or Cylinder Head Type	**Displacement Factor (DF)**
Restricted Induction[1]	1.0
Unrestricted Induction (GT-1)	1.1
Unrestricted Induction (GT-2 to GT-5)	1.05
Forced Induction	1.55
Reciprocating Engines - 2 valves per cylinder	0.85
Reciprocating Engines – 4 valves per cylinder	**1**
Wankel Engines - non-bridge ported	1.35
Wankel Engines - bridge ported	1.55
Wankel Engines - peripheral ported	1.85
Reciprocating Engines - 3 valves per cylinder	0.85

All applicable displacement factors will be multiplied together to give the overall displacement factor for the competitor's particular vehicle. The overall displacement factor is multiplied by the displacement of the specific engine currently installed in the competitor's vehicle to give an adjusted engine displacement. This adjusted engine displacement is used to determine vehicle classification according to the table in Section 30 of the GT Regulations

31 - GT-S Class

a) To allow competitors an opportunity to race vehicles that do not conform to the preparation regulations listed in these regulations, a GTS class shall be provided. GTS vehicles must meet the current WCMA safety regulations as defined in these Regulations.
b) GTS vehicles must be based on a production vehicle.

[1]Refer to section 17 - Induction and Exhaust for clarification on restricted induction.

SECTION 2 - IMPROVED TOURING REGULATIONS

1 - Purpose

a) IT cars are intended to be an introductory class to enable competitors to build and compete on a race track, while still being able to drive their cars on the street. WCMA may reserve the right to re-classify cars based on their observed competitive advantage. This reclassification will take place early in the competition year. Unless otherwise stated herein, assume that any other modifications are illegal. Applications for changes to rules are to be made to WCMA through the normal channels.
b) It is the intent of these rules to restrict modifications to those useful and necessary to construct a safe race car. This class is intended to allow a variety of popular, inexpensive cars to be eligible; however, those determined by WCMA to be outside these parameters will be classified as ST(Sport Touring) or encouraged to move to the GT classes. Entrants are not guaranteed the competitiveness of any car. Competition adjustments, other than reclassification, are not allowed.
c) Other than those specifically allowed by these rules, in IT-O, IT1-3 no component or part found on a stock example of a given vehicle may be disabled, altered, or removed for the purpose of obtaining any competitive advantage. Cars not in compliance with this rule will race as ST(Sport Touring) cars until they comply.
d) Tube frame chassis are specifically prohibited in this class.
e) The terms "OEM" and "stock" may be used interchangeably and imply originally installed equipment by manufacturer.
f) J**apan or European spec cars are allowed. Cars may be subject to different weights in the Improved Touring Category Specifications (ITCS).**
g) Diesel powered cars are permitted.

2 - Vehicle Classification

a) There will be four IT classes - IT-O, IT1, IT2 and IT3. (note engine displacement size is determined after factors applied using calculation.)

Class	**Engine Displacement[2]**	**Class Factor**
IT-O	3501cc and larger	0.87
IT1	2551 to 3500cc	0.95
IT2	1751 cc to 2550 cc	1.2
IT3	up to 1750 cc	1.3

b) Vehicle weight: the competitor's vehicle competition weight is determined in the ITCS chart,(see separate document). If the vehicle is not in the chart the competitor may use the following formula to calculate class and minimum weight. If the vehicle is found to be outside where the competitor believes it should be by class and weight. The competitor can then file an appeal to the WCMA tech committee (techcommitee@wcma.ca) to have the car re-classed.
c) **If your car is not listed in the ITCS or if these calculations result in a new race weight outside of achievable weight even with allowed ballast added, then the car may be raced at a published stock curb weight plus 180 lbs. A competitor using this rule must declare weight on the car at beginning the season. The weight sticker on the car must have a letter**

[2] Engine displacement includes all applicable displacement factors

P in front of the weight sticker. The tech committee and/or the chief scrutineer may make competition adjustments, weight additions or throttle restriction.

d) For the purpose of classification, "Engine Displacement" is defined as the displacement of the specific engine currently installed in the competitor's vehicle, multiplied by all applicable displacement factors.

Induction or Cylinder Head Type	Displacement Factor (DF)
Stock Induction[3]	1.0
Forced Induction (unmodified)[4]	1.3
Aftermarket Forced Induction[5]	1.6
Hybrid Engine (see definitions/restrictions)[6]	1.3
VTEC or VVT systems[7]	1.1
Wankel[8] Engines	1.4
2 valves[9] per cylinder OHV (pushrod)	0.75
2 valves per cylinder OHC	0.85
3 valves per cylinder	0.88
4 valves per cylinder SOHC	0.95
4 valves per cylinder DOHC	1

Additional factors:

- All aftermarket forced induction is classed in ST(Sport Touring)
- Any modifications not authorized herein would result in car moving to ST (Sport Touring)
- Hybrid engines are classed in ST(Sport Touring).
  NOTE: A hybrid engine built as a temporary repair is permitted with the permission of the chief scrutineer; the additional 100lbs is required, plus the car must be re-classed as per the new displacement at a factor of 1.0 for this temporary purpose only (limit of 2 race events) (all other applicable factors apply as well)

This gives the corrected engine displacement for your engine. Use this displacement to determine which class to fit in.

Example: Acura with VTEC B18
1797cc X 1.0 (stock induction) X 1.1 (vtec)=1977cc. Fits in IT2 class

e) Once the vehicle class is determined, the class factor is used to determine the minimum weight of vehicle. Take the adjusted displacement and multiply by class factor plus 180 lbs to determine minimum weight.

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[3] Stock induction: As factory equipped, modifications allowed as per current WCMA rules.
[4] Forced induction: as factory equipped only. No change in boost level is permitted.
[5] Aftermarket forced induction: modified stock turbo/super charger or larger than stock on a factory manifold. Also includes custom turbo / supercharger systems.
[6] Hybrid: a block that has a cylinder head that came from another engine. E.g., A Honda converted to vtec but the block never was available that way, or a Toyota 4AG (1600) converted to 7AG (1800) which the factory never made
[7] VTEC or VVT: Any engine that has factory variable lift or timing of valves or camshafts.
[8] Wankel: An engine with no pistons
[9] 2 valve: Each cylinder has only one intake and one exhaust valve.

Example; Same Acura, minimum weight = (1977cc x 1.2) + 180 = 2552 lbs

f) The minimum weight of the classified car (in pounds) shall be displayed beneath the class designation on the driver's door. Minimum font height is 1 inch.
g) To maintain the stock basis of Improved Touring, updating and/or backdating of components is only permitted within cars of the same make, model, body type (e.g. sedan, station wagon, convertible, etc.), and engine size as listed on a single Improved Touring Specification Line. Any updated/backdated components shall be substituted as a complete assembly (engine long block, transmission/transaxle, induction system, differential/axle housing).
h) To establish the originality and configuration of the vehicle, each driver/entrant shall have a factory shop manual for the specific make, model, and year of the automobile. This manual shall be presented when so requested at any technical inspection. If the factory shop manual is no longer available from the vehicle manufacturer, an aftermarket shop manual will be accepted with proof of non-availability from the vehicle manufacturer. The proof of legality shall rest on the protestor and/or protested.
i) WCMA shall specify the minimum weight for each classified car as qualified or raced, with driver. The minimum weight will be published in the ITCS

3 - Authorized Engine Modifications

The following modifications are authorized on all IT Category cars. Modifications shall not be made unless authorized herein. No permitted component/modification shall additionally perform a prohibited function.

1) Intake requirements
    a. All cars shall use the installed engine's stock style air metering device (e.g. throttle body), intake manifold and sensors, unless noted otherwise. Boring of the throttle body is not allowed.
2) Reciprocating Engines (only)
    a. any carburetor jets, needles, and/or metering rods may be used in the stock or approved optional carburetor(s). Alternative needle valves are permitted. Removable jets may be replaced or resized. In IT-O, IT1-3 the number of carburetors may not be changed from standard. No venturi (including secondary or auxiliary) of any carburetor may be modified in any way. Cars with additional carburetors added or Injection systems removed and replaced by carburetor(s) shall move into the ST(Sport Touring) category.
    b. Certain cars have optional carburetors listed. On these cars, adapter(s) may be used to mount the optional carburetor(s), provided the adapter serves no performance function, i.e., plenum chamber, etc.
    c. External throttle linkage to the standard or optional carburetor(s) may be modified or changed. Choke mechanisms, plates, rods, and actuating cables, wires, or hoses may be removed. Method of operating the secondary throttle may not be modified.
    d. The original, standard intake manifold shall be maintained. No porting or polishing of the manifold is permitted except as allowed by Regulation 3.1.v.
    e. All air entering the intake tract shall pass through the carburetor or fuel injection air inlet.
    f. All single carbureted cars may fit an approved optional carburetor. Approved optional carburetors are:
        i. 1 Weber 32 DGV/DGAV/DGEV
           1 Weber 32/36 DGV/DGAV/DGEV
           1 Weber 32/36 DFV/DFAV/DFEV
           1 Weber 34 DAT/DATR/DATRA/DMTR
           1 Holley-Weber 5200

g. Weber carburetor(s) with swaged fuel inlet fitting shall be replaced by drilling and tapping the carburetor body for a threaded fitting.
h. Fuel-injection cars may alter fuel mixture through the modification of the resistance values of the sensors which feed the computer. The computer chips may be replaced. The engine management computer may be altered or replaced. A throttle position sensor and its wiring may be added or replaced. A MAP sensor and its wiring may be added. Other existing sensors, excluding the stock air metering device, may be substituted for equivalent units. Fuel injector size must be stock. Air induction/orifice size(s) shall not be altered, and no new orifices shall be created by disconnecting standard equipment. External throttle linkage to the standard fuel injection may be modified or changed
i. Readily available pump fuel is mandatory. Ethanol blended fuels are allowed, up to 10%. Race gas not permitted. Nitrous Oxide not permitted. No other alcohol based fuel is permitted. It is the competitor's responsibility to prove fuel used is legal,
j. Any intake orifice modifications shall move cars to the ST(Sport Touring) category.
k. Any fuel pump(s)/filter(s) may be used. Pump(s) may be relocated, but shall not be located in the driver/passenger compartment. If a mechanical pump is replaced, a blanking plate may be used to cover the original mounting location. Fuel line(s) may be replaced, relocated, and given additional protection. If the relocated line(s) passes through the driver/passenger compartment, it/they shall be metal or metal braided, and be securely fastened. An external fuel pump pressure regulator may be installed.
l. Air cleaner assemblies may be modified, removed or replaced. Velocity stacks, ram air or cowl induction are not permitted unless fitted as original equipment. Air intake hoses, tubes, pipes, resonators, intake mufflers, housings, etc., located ahead of the air metering/measuring device (i.e. air flow meter, air mass meter) may be removed or substituted. In applications that do not incorporate an air metering/measuring device ahead of the carburetor/throttle body (i.e. speed density system), these items may be removed or substituted.
m. Exhaust emission control air pumps, associated lines, nozzles, and electrical/mechanical EGR devices may be removed. If such items are not removed, they shall not be modified in any way. If EGR devices/nozzles are removed from a cylinder head or manifold, any holes remaining shall be completely plugged. Water to an intake manifold may be blocked or removed as part of the emission system.
n. Those vehicles which have emission control devices removed and which are not registered and licensed for street operation may use any gasoline meeting the requirements of WCMA Sporting Regulations section 11.8 *Engine Fuel To Be Used*.
o. Those vehicles registered and licensed for street use shall use the fuel specified by the workshop/owner's manual.
p. Any ignition system which utilizes the original distributor for spark timing and distribution is permitted. Internal distributor components and distributor cap may be substituted. Crankfire ignition systems are prohibited in IT-O, IT1-3 unless fitted as original equipment. Cars fitted with crankfire system after manufacture will be moved to ST(Sport Touring). Any spark plugs and ignition wires may be used. Ignition timing is unrestricted. Any battery of the same type, size, and voltage as the original may be used. Additional battery hold down devices may be used, and are strongly recommended. Cars originally equipped with two (2) 6-volt batteries may replace them with one (1) 12-volt battery installed in either of the original battery locations. Cars with batteries relocated to the driver/passenger compartment must comply with GT Regulations Section 29.a.
q. Cars originally equipped with plastic/phenolic timing gears may substitute metal gears, provided that the design, dimensions, and cam timing remain stock. Adjustable timing

gears are prohibited in IT-O, IT1-3 unless fitted as stock. ST(Sport Touring) class cars may use adjustable timing gears.

r. Any exhaust manifold or header may be used. Any muffler may be used. The maximum permissible noise level as measured 16 m (50 feet) from the side of the track surface is 108 dBA, subject to local track regulations. If fitted, catalytic converter(s) may be removed.

s. Oil pans, pan baffles, scrapers, windage trays, oil pickups, lines, and filters are unrestricted. Oil and power steering hoses may be replaced with metal braided hose (i.e. Aeroquip). A pressure accumulator/"Accusump" may be fitted. The location of the filter and accumulator are unrestricted, but they shall be securely mounted within the bodywork. All oil lines that pass into or through the driver/passenger compartment shall be metal or metal braided hose. Dry sump systems are prohibited in IT-O, IT1-3 unless fitted as standard equipment. Dry sump systems may be installed in ST(Sport Touring) Class cars only. Engine oil and oil additives are unrestricted.

t. Catch tanks may be fitted and are highly recommended. In order to prevent fluid spillage, all fluid reservoir and sump vent tubes must be routed to a suitable container of one (1) litre minimum capacity for vehicles with engine displacement of under two litres. Vehicles with an engine displacement of over two litres require a suitable container of a minimum of 2 litres capacity. Any catch tanks shall be translucent or be fitted with sight tubes to facilitate easy checking of their contents.

u. Engines may be bored to a maximum of .040 inch over standard bore size. Factory oversize replacement pistons or their exact equivalent shall be used. Equivalent pistons shall provide the same dome/dish/valve relief configuration, ring thickness and spacing, pin height relationship, weight, and compression ratio as factory replacement oversize pistons. Piston rings are unrestricted. The fitting of other styles of pistons reclassifies a car to ST(Sport Touring)

v. Balancing and "blueprinting" of the engine assembly are permitted. Lightening of parts beyond the minimum material removal necessary to balance is prohibited.

w. Manifold and cylinder head port matching is permitted. No material may be removed further than one (1) inch in from the manifold to cylinder head mounting face(s). Carburetor mounting surface(s) shall not be modified and external dimensions of the cylinder head or intake manifold may not be reduced to facilitate internal porting. Two piece manifolds are not intended to be port matched at their intermediate point.

x. Valve guide material is unrestricted. Where a factory specification for original cylinder head thickness can be proven, a tolerance of .025 inch less than the service limit will be permitted. Under no circumstances may the compression ratio be increased by more than one-half (.5) point. An offset key may be used to return cam timing to the factory specifications. On engines with dual overhead camshafts, this key shall be installed on the crankshaft only.

y. Any clutch disc and pressure plate of stock diameter may be used, provided that they shall be bolted directly to an unmodified stock flywheel. Balancing of the flywheel/clutch/pressure plate assembly is permitted. Lightening of the flywheel beyond the minimum material removal necessary to balance is prohibited in IT1-3. The addition of an external scattershield is permitted and recommended.

z. Alternate water pump, alternator**, crankshaft** and power steering pulleys of any diameter or material may be used. **Crankshaft pulleys must remain stock for supercharged engines.** Type of accessory drive (e.g., V-belt, toothed belt, etc.) shall remain as stock.

aa. Hardware items (nuts, bolts, etc.) may be replaced with similar items performing the same fastening function(s). Cylinder head gasket(s) may be replaced with any gasket(s) having the same compressed thickness as stock. Other engine gaskets are unrestricted. Engine drive belts may be replaced with others of equivalent OEM specifications.

bb. All engine components not otherwise listed in these rules shall meet factory specifications for stock parts in IT-O,1-3 Class. Where factory specifications are absent or unclear, e.g., cylinder head thickness and/or combustion chamber depth, etc., WCMA may establish an acceptable dimension and/or allowable tolerance from stock.
cc. The application and/or use of any painting, coating, plating, or impregnating substance (i.e. anti-friction, thermal barrier, oil shedding coatings, chrome, anodizing, etc.) to any internal engine surface, including intake manifolds, is prohibited.
dd. One (1) engine stayrod may be added.

3) **Rotary Engines (only)**

a. Any porting or polishing is prohibited
b. Rules 2.3.1.a.-k. And 2.3.1.m.-p., also apply
c. Crankshaft pulley is unrestricted.
d. Alternate rotor seals and springs are permitted.

4 - Cooling System

a) Any radiator may be used, provided it is mounted in the original location, maintains the same plane as the original core and requires no body or structure modifications to install in IT-O,1-3 Class.
b) Oil cooler(s) may be added or substituted. Location within the bodywork is unrestricted, provided that it/they are not mounted within the driver/passenger compartment.
c) Cooling fans may be removed or replaced. Electrically operated fans with manual or automatic actuation may be fitted.
d) Thermostats may be modified, removed, or replaced with blanking sleeves or restrictors.
e) Air conditioning systems may be removed in whole or in part.
f) Screens of one-forth (1/4) inch minimum mesh may be mounted in front of the radiator and/or oil cooler(s) and contained within the bodywork.
g) Unnecessary hoses may be plugged or blocked. Heater water control valve(s) may be added or substituted. Heater core and hoses shall not be removed.
h) The cooling system must be a closed system or its overflow lines must run to a 2.3l (litre) minimum capacity catch tank separate from the oil catch tank.

5 - Transmission/Final Drive

a) Any final drive ratio is permitted provided it fits the stock differential/transaxle housing without modification to the housing.
b) Any limited slip or locked differential is permitted.
c) No alteration to the stock transmission gear ratios for the make, model, type and engine size of automobile is allowed in IT-O,1-3. Gear ratios are free in ST(Sport Touring) Class only, provided they fit in an OEM transmission/transaxle housing. Sequential gear boxes are NOT permitted in IT or ST Class.
d) Hardware items (nuts, bolts, etc.) may be replaced by similar items performing the same fastening function(s).
e) Shift lever may be bent above tunnel or floor.
f) No vehicle with an automatic transmission shall compete in the Improved Touring Category unless special permission is obtained.

6 - Chassis

a) Minimum ride height is five (5) inches, to be measured without driver at the lowest point of the rocker panel, but not to include welded seams or fasteners.
b) No body panel, part of the exhaust, fuel cell or part of the chassis/suspension shall touch the ground if the vehicle sustains a flat tire on one wheel.

7 - Springs and Shock Absorbers

a) Any shock absorbers may be used, provided they attach to the original mounting points. The number and type (e.g., tube, lever, etc.) of shock absorbers shall be the same as stock. The interchange of gas and hydraulic shock absorbers is permitted. Remote reservoir shock absorbers are permitted. The location of the reservoir is unrestricted. No stock absorber may be capable of adjustment while the car is in motion, unless fitted as original equipment.
b) MacPherson strut equipped cars may substitute struts, and/or may use any insert. Spring seat ride height location may be altered from stock.
c) Springs of any origin may be used, provided they are of the same number and type as originally fitted, i.e., coil, leaf, torsion bar, and that they shall be installed in the original location using the original system of attachment. The joining of two or more coil springs by any means is prohibited. The use of tender springs (designed to capture the spring within the perches at full droop) are permitted provided the tender springs are completely compressed when the car is at a static ride height. Shackles or spacers may be used to adjust leaf spring ride height. Spacers, including threaded units with adjustable spring seats, may be used with coil springs. These adjusters may be permanently attached to the shocks.
d) Spacers and lowering blocks may be used between leaf springs and the point(s) of attachment to the axle housing.
e) Coil over struts or shock absorbers, where a threaded sleeve is permanently attached to a housing, are permitted in all classes.

8 - Suspension Control

a) Any anti-roll bar(s), traction bar(s), Panhard rod or watts linkage may be added or substituted, provided its/their installation serves no other purpose. The mounts for these devices may be welded or bolted to the structure of the vehicle. No suspension control mount or component shall be located in the trunk or driver/passenger compartment unless installed by the manufacturer as original equipment. Traction bars used to control axle rotation shall be one piece solid bar or tube. HEIM or spherical rod ends may be fitted.
b) On those cars where an anti-roll bar also acts as a suspension-locating device, the diameter of the bar may be changed. Bar attachment and pivot points on the chassis and control arms shall remain as stock, except as provided for in Regulation, 2.9.a and 2.9.b

9 - Suspension Mounting Points

a) Cars equipped with MacPherson strut suspension may decamber wheels by the use of eccentric bushings at control arm pivot points, by the use of eccentric bushings at the strut-to-bearing-carrier joint, and/or by use of slotted adjusting plates at the top mounting point. If slotted plates are used, they shall be located on existing chassis structure and may not serve as a reinforcement for that structure. Material may be added or removed from the top of the strut tower to facilitate installation of adjuster plate.

b) On other forms of suspension, camber adjustment may be achieved by the use of shims and/or eccentric bushings.
c) All forms of suspension may adjust caster by means of shims or eccentric bushings. Additionally, MacPherson strut-equipped cars may adjust caster at the upper strut mounting point/plate.
d) Independent rear suspension mounting holes may be slotted and reinforced for purposes of camber and/or toe adjustment. Material may be removed from the top of the strut tower to facilitate installation of adjuster plates.
e) Cars may add tower braces/stabilizer rods located in the following areas both at the front and at the rear:
    i. Between lower suspension mounting points.
    ii. Between the upper strut towers on MacPherson strut equipped cars.
    iii. Between upper shock absorber mounts on cars with other forms of suspension.
f) Bushing material, including that used to mount a suspension subframe to the chassis, is unrestricted.
g) Rubber bump stops may be removed, but their chassis mounts, brackets, etc., may not be altered in any way.
h) No other relocation or reinforcement of any suspension component or mounting point is permitted.
i) Hardware items (nuts, bolts, etc) may be replaced by similar items performing the same fastening function(s).

10 - Brakes

a) Brake pads, brake linings and brake fluid are unrestricted.
b) Backing plates and dirt shields may be ventilated or removed. 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. Brake rotors may be modified to fit either slotted or drilled components provided they are the same size as stock.
c) Brake lines may be replaced with steel lines or Teflon lined metal braided hose. Lines/hoses may be relocated and may be given additional protection. Brake fittings, adapters, and connectors are unrestricted. Brake system circuitry may be revised, but no modification or substitution of the original master cylinder, its location, or mounting is permitted in IT-O,1-3. Calipers and rotors may be revised or updated as long as they fit in the stock mounting locations. Any revised brakes must be of the same manufacturer as the original equipment. No modification (grinding, shimming) of caliper or rotor mounting points. No modification of stock calipers. No adapters or machining to fit different calipers. All ST(Sport Touring) Class cars may use any braking system in compliance with GT Regulation 1.26 “Brakes”.
d) Brake proportioning valves may be used provided that they are of the in-line, pressure limiting type.
e) Parking brakes, mechanisms, and actuating components may be removed.

11 - Wheels/Tires

Any wheel/tire may be used within the following limitations:

a) Any wheel may be used as long as the tire/wheel combination will fit within the stock wheel opening as checked in a vertical direction.
b) Knockoff/quick-change type wheels are prohibited. Wheels must be made of metal.

c) DOT approved passenger vehicle tire with an appropriate speed rating that exceeds the potential speeds of their vehicle must be used. Racing, recapped or re-grooved tires are not allowed. Tire size is unrestricted. The only modification allowed to tires is having treads "shaved" or "trued".
d) Track may be changed to accommodate larger tires, provided that there is safe tire/fender/chassis clearance under all conditions of steer, bump, and rebound. Wheel spacers are permitted.
e) Tire tread (that portion that contacts the ground under static conditions) shall not protrude beyond the fender opening when viewed from the top perpendicular to the ground. To determine compliance, the vehicle should be rolled through a powdered substance, as raced with driver, in order to indicate the tire tread contact patch under static conditions.
f) Any wheel stud, bolt, and or nut is permitted. OEM wheel bolts may be replaced with studs/nuts.

12 - Body/Structure

a) Exterior surfaces of fenders and wheel openings shall remain unmodified. It is permitted to roll under or flatten any interior lip on the wheel opening for tire clearance. Cars with plastic/composite fenders may remove any interior wheel opening lip, but the resulting material edge shall be no thinner than the basic fender material thickness. Non-metallic inner fender liners may be removed. **Fender flares are permittted if original equiped at factory or for decorative or rust repair purpose. The tire used must still fit in the stock opening (as per existing rules). The competitor must be prepared to prove the flare is for this purpose only[10].**
b) A front spoiler/air dam is permitted. It shall not protrude beyond the overall outline of the body when viewed from above perpendicular to the ground, or aft of the forward most part of the front fender opening. This body outline does not include bumpers or bumper mounts. The spoiler/air dam shall be mounted to the body, and may extend no higher than four (4) inches above the horizontal center-line of the front wheel hubs. It shall not cover the normal grille opening(s) at the front of the car. Openings are permitted for the purposes of ducting air to the brakes, cooler, and radiator. The spoiler shall have no support or reinforcement extending aft of the forward most part of the front fender wheel opening. Ground clearance at spoiler as specified in 6 a) above.

   NOTE: Integrated bumper assemblies are defined as those designs where an external non-metallic bumper cover completely encloses the primary energy-absorbing bumper and where this cover could be installed in its normal position with the underlying bumper removed. On cars with integrated bumpers, the front spoiler or air dam may be attached to the bumper cover.
c) Openings may be cut in the front valance to allow the passage of up to a three (3) inch diameter duct leading to each front brake. These openings shall serve no other purpose.
d) No part of the car, except for the exhaust system and suspension components, shall be lower than the lowest part of the wheel rims.
e) Windshield clips and rear window straps per WCMA Technical Regulations 1.6.a-f and 1.6.h, are permitted and recommended.
f) Hood and trunk pins, clips, or positive action external latches are permitted. Stock hood and trunk latches may be disabled or removed; if so, some positive action external fastening method shall be used. Engine compartment insulation may be removed.
g) **Removal of factory impact door beams is <u>not</u> permitted.**
h) Convertible tops and attaching hardware shall be completely removed. Manual and electric sunroofs, original or aftermarket, where the panel is not normally removable shall be retained and run in the closed position. Components (motors, cables, rails) may be removed provided the panel is securely retained. Removable sunroof or T-top may be retained if bolted or welded in, or removed completely. If removed these resulting openings must be covered in a suitable and

[10]**Competitors found using this rule to gain advantage with the use of larger tires is not fair to other competitors and may be penalized.**

workmanlike fashion. Glass sunroofs must be removed and the resulting opening covered in a suitable and workmanlike fashion. All sunroofs may be replaced with panel or replacement skin of the same material as the original surrounding roof material.

i) Cars must meet WCMA Sporting Regulation 11.4 “Appearance of Cars”, at all times.

j) All chassis/structural/electrical repairs, if performed, shall be in concurrence with factory procedures, specifications, and dimensions. Unless specifically authorized by the manufacturer for repair or allowed by these rules, no reinforcement, i.e., seam welding, material addition, etc., is permitted in IT-O,1-3. ST(Sport Touring) cars may be seam welded or reinforced as necessary.

k) Body repair shall be performed using every reasonable effort to maintain stock body contours, lips, etc. Any body repair modification having as its purpose increased clearance is prohibited. In those circumstances where stock trim/molding pieces are not available through all normal replacement channels, proof of such unavailability shall be provided by the competitor.

l) Radio antennas may be removed. Antennas may be removed. Antennas for two-way radio may be added.

m) Body side moldings, rocker panel moldings and wheel opening trim pieces (not stock flares) may be removed. Resulting holes may be filled.

13 - Driver/Passenger Compartment - Trunk

a) Seats must meet specifications of WCMA Technical Regulations - Race Appendix 4 Driver Restraint Systems.

b) Any steering wheel except wood rimmed types may be used. Quick release steering hubs are permitted. Any shift knob may be used.

c) Gauges and instruments may be added, replaced, or removed. They may be installed in the original instrument(s) location using a mounting plate(s), or any other location using a secure method of attachment. Other than modifications made to mount instruments and provide for roll cage installation, the remainder of the dash "board" or panel shall remain intact in IT-O,1-3 Class cars.

d) Any interior or exterior mirrors may be used.

e) Front passenger seat, rear seat back, rear seat bottom cushion(s), sun visors, seat belts and their attaching hardware and bracketry may be removed. In those automobiles where the rear seat back provides the only solid bulkhead between the driver/passenger compartment and an exposed stock gas tank, a metal bulkhead completely filling the exposed seat back opening shall be installed.

f) In those automobiles where rear seat back removal does not expose the stock gas tank directly to the driver/passenger compartment, a metal (only) bulkhead is optional.

g) Carpets, center consoles, floor mats, headliners, sun roof liner and frame, dome lights, grab handles, and their insulating, attaching or operating mechanisms may be removed. The door window glass, window operating mechanism, inner door trip panel, armrest, map pockets, and inside door latch/lock operating mechanism may be removed and the inner door structural panel may be modified, but not removed. The stock side impact beam, if equipped, and the outside door latch/lock operating mechanism shall not be removed or modified. This gutting of the door shall only be made to the driver's door and shall only be made if roll cage incorporates NASCAR-style side protection extending into the door. Door trim panels may be removed entirely. It is recommended that the resulting opening be covered in a non-flammable material (i.e. metal) or sharp protrusions removed from the resulting hole. The car must still meet its minimum weight after the removal of these components.

h) Any removable covers used to cover spare tires, tool, bins, etc, may be removed along with attaching hardware and brackets. Carpets, mats, and their insulating or attaching materials may be removed from the floor and recesses of the cargo/trunk/spare tire area.

i) Dead pedal/foot rests and heel stop may be added.

j) Ducting may be added to provide fresh air to the driver/passenger compartment. This ducting shall be located in the driver and or passenger window area, with no modifications to the bodywork.
k) Radio receivers **and infotainment systems** may be removed or replaced. Two-way radios are permitted for car to pit communication only. Data transmission in any form is prohibited. Data may be acquired but must be stored on board while the car is on the track.
l) Modifications may be made to the foot pedals to improve the comfort of and control accessibility to the driver.
m) WCMA may approve the use of automatic transmissions and/or hand controls on a case-by-case basis.
n) Ballast may be added but must be securely mounted within the coachwork in such a fashion that a tool is required for removal of ballast.

14 - Safety

a) All cars must have a roll cage installed meeting the requirements of WCMA Technical Regulations - Race Appendix 1. Roll Cage Specifications.
b) Fuel cells may be used, and are recommended, but shall comply with WCMA Technical Regulation – Race 1.18.c “Fuel Systems”. When fuel cells are added their capacity shall not be any greater than the original fuel tank plus (+) 10%. The use of a fuel cell is very strongly recommended unless the stock fuel tank is located between the axle centerlines and within the main chassis structure (i.e. frame rails, etc.). Cars already being raced that do not comply will be grandfathered or directed to install a fuel cell. Additional straps and/or protection may be required. All fuel cells MUST comply with GT Fuel Cell Specifications. Proper bracing to protect the fuel cell in the event of a rear-end crash is required. If a fuel cell is installed in the rear hatch/rear trunk area, the OEM floorpan in that area may be replaced with metal in order to make it easier to mount the fuel cell and close out the area around the fuel cell. There must be a metal bulkhead completely separating the cockpit from the compartment containing the fuel cell. This does not negate the requirement that the fuel cell bladder be contained in a metal container.
c) An electrical master ("kill") switch is required. See WCMA Technical Regulation – Race 1.27.a “Safety Kill Switch”.
d) Installation of a fire extinguisher or fire system is recommended as specified in WCMA Technical Regulations - Race Appendix 2.3 Onboard Fire Suppression System.
e) Safety harness systems, window nets, and fire extinguishers shall meet or exceed all requirements as specified in WCMA Technical Regulations - Race Appendix 4 Driver Restraint Systems, Appendix 5.4., and Appendix 2.3.a)
f) Exposed headlights, parking lights, and side marker lights shall be taped or removed entirely, provided that the resulting openings are covered in a suitable manner to prevent air passage. OEM light assemblies mounted on or below (but not in) the bumper shall be removed, and all resulting holes shall be covered to prevent air passage through said holes.
g) The vehicle must be equipped with a towing eye or strap at the front and rear. Such a towing eye should not protrude dangerously from the vehicle.
h) Spare wheels and tires shall be removed.
i) Air bags shall be disarmed and may be removed.
j) Whenever the track surface is wet, thereby causing spray, all cars on the track shall turn on their tail/rain lights. The brake lights must continue to be functional whenever the tail/rain lights are used. The tail/rain lights must be dimmer than the brake lights when they come on, unless amber turn signal lamps are wired as rain lights.

15 - Improved Touring Category Specifications (ITCS)

a) The Improved Touring Category Specifications (ITCS) is available as a separate file on the WCMA website.

16 - IT-J Class

16.1. Purpose

a) To create a class where cars built for “Chump Car”, “24 Hours of Lemons” or Ice Racing that meet WCMA sporting and technical regulations to race at WCMA sanctioned events.
b) IT-J is designed as a “fun run” class, without any promise or intent of performance equitability, but is designed to provide a way for drivers to enjoy regional races with their race cars.
c) In no way will any waivers be considered or granted in areas regarding safety of the vehicle or driver.

16.2. Safety

a) All IT-J competitors must comply, at a minimum, to all ChumpCar & Lemons safety rules and MUST upgrade to meet any areas of car preparations where WCMA safety rules require additional protection, material, or driver safety gear. No exceptions. Frontal head restraints are mandatory.
b) Drivers must hold a valid WCMA or equivalent license.
c) Safety rules regarding vehicle construction will be at the discretion of the WCMA Tech Inspector and/or Race Steward regarding roll cages, seat bracing, safety belts, fire suppression, etc.
d) Competitors running an IT-J car that does not pass its very first WCMA sanctioned technical inspection will be eligible for a full refund

16.3. Car preperation

a) IT-J vehicles may race with prior accident damage, as long as that prior damage does not create a danger to the driver of that vehicle or fellow competitors.
b) It is preferred that non-functional additions to vehicles, whose primary purpose is to express creativity, theme, or general humor are removed. Non-functional additions are allowed only if they do not create a potential safety hazard to driver or fellow competitors or track workers.
    - External “props” such as (but not exclusive to) mannequin legs, paper-mache shark fins, hood mounted longhorns, butterfly wings, etc are not allowed.
    - Death race 2000, road warrior, military vehicles and vessels with mounted armaments and animal house “attack” vehicles are expressly forbidden.
c) Vehicle eligibility
    - Must be a “mass produced”, gasoline-powered, four wheeled passenger car
    - Minimum weight of 1800lbs and maximum weight of 4000lbs
    - Engines must be production-based
    - Tires must conform to ChumpCar tire standards and be of 190 treadwear or greater
    - Preparation regarding safety of battery, brakes, suspension, and engine must meet WCMA IT standards.

16.4. Class rules

a) Handicapping of IT-J vehicles based on qualifying laps, actual race lap times, car prep, and by competitor input, may be instituted at the discretion of the Race Stewards and/or local class organizer.

b) IT-J vehicles will compete within the IT-J class, and may run in a group with other WCMA classes of closed wheel cars.

- Should a competitor's IT-J car qualify under the IT rules to run in WCMA classes,that competitor is welcome to sign up for both classes – assuming the car meets or exceeds all WCMA mandated appearance rules for IT.

SECTION 3 - SPEC MIATA REGULATIONS

1 - Purpose

1. The Spec Miata (SM) class is intended to provide the membership with the opportunity to compete in low cost, production-based cars with limited modifications, suitable for racing competition.

2 - Regulations

1. **The parent regulations for this class are contained within the SCCA General Competition Rules and can be found at www.scca.com under Club Racing, in the "Cars and Rules" section.**
2. **The regulations listed in this section take precedence over the SCCA rules.**

3 - Tires

1. **All cars shall use the P205/50ZR15 Hoosier "SM7" Spec Miata Dry or the P205/50 15 Hoosier "H20" Spec Miata wet tires. The SM6 will be permitted through the end of 2014. Competitors may also use the Toyo RR for dry and the Toyo RA-1 for wet or practice only, in tire size 205/50 15.**

SECTION 4 - SPORT TOURING REGULATIONS

1 - Purpose

Sport Touring is a class created to allow IT cars that have continued modifications beyond IT rules a place to race.

Vehicles used in the series must be identifiable with the vehicles offered for sale to the public and available through the manufacturer's normal distribution channels. The intent of these rules is to allow Club Racing with minimal modifications and allow new cars to be built to the same spec as well. No model years older than 1985 will be permitted, exception: older cars may participate if complying with fuel cell regulations. WCMA does not guarantee the competitiveness of any car. Vehicle modifications will be limited to those required to meet SAFETY SPECIFICATIONS and AUTHORIZED MODIFICATIONS listed herein. Unless a particular modification, or part, is approved in these rules, the vehicle and all of its relevant parts and assemblies shall be stock for the correct make and model of car.

2 - Eligibility

Vehicles meeting one or more of the following criterion may compete in the Sport Touring category;

- Cars built specifically under these ST rules
- GCR listed IT cars, 1985 and newer, under the current IT specifications.
- *Cars shall compete as follows: 2550cc and below are eligible for STU. 2551cc and above are eligible for STO.*

For the purpose of classification, "Engine Displacement" is defined as the displacement of the specific engine currently installed in the competitor's vehicle, multiplied by all applicable displacement factors.

Sport touring eligible cars will use the following formula to calculate minimum weight and classification

(Engine Displacement) X (All applicable displacement Factors) = corrected engine displacement
Note: corrected engine displacement determines classification

Example 1
2302cc X Stock induction (1.0) x non-stock Camshafts (1.15) = 2647cc new displacement
2647cc X 1.0 Class Factor + 180lbs (Driver Weight)= 2827lbs race weight.

Example 2
3219cc X Stock Induction (1.0) = 3219cc displacement
3219 X 0.88 ST-O Class Factor + 180lbs (Driver Weight) = 3013lbs race weight.

Class	Engine Displacement	Class Factor
ST-U	2550CC and Smaller	1
ST-O	2551CC and Larger	**0.83**

Induction or Cylinder Head Type	Displacement Factor (DF)
Stock Induction[11]	1.0
Forced Induction (unmodified)[12]	1.3
Aftermarket Forced Induction[13]	1.55
Non Stock Camshafts	1.15
Wankel[14] Engines	1.5
2 valves[15] per cylinder OHV (pushrod)	0.75
2 valves per cylinder OHC	0.85
3 valves per cylinder SOHC	0.88
4 valves per cylinder SOHC	0.95
4 valves per cylinder DOHC	1

Definitions:
Stock Induction: As factory equipped, modifications allowed as per current WCMA rules.
Forced-induction: Aftermarket or factory equipped
Wankel: an engine with no pistons i.e. rotary
2 valve: Each cylinder has only one intake and one exhaust valve
OHV: Over head valve (pushrod engine)
SOHC: Single over head camshaft
DOHC: Dual over head cam shaft i.e. one exhaust camshaft one intake camshaft
Non Stock camshafts: Any Camshafts that did not originally come with cylinder head or engine.
i.e.): Aftermarket camshafts, not made by manufacturer or cams sourced
(Non North American spec cams are considered to be non stock)

If these calculations result in a new race weight outside of achievable weight even with allowed ballast added, then the car may be raced at a published stock curb weight plus 180 lbs. A competitor using this rule must declare weight on the car at beginning the season. The weight sticker on the car must have a letter P in front of the weight sticker. The tech committee and/or the chief scrutineer may make competition adjustments, weight additions or throttle restriction.

As the Sport Touring class grows it will become necessary to create a sport touring category specification chart to help classify cars. **The race weight in the sport touring category specification chart will then override these calculations.**

3 - Bodywork

a) Standard body appearance must be strictly maintained. Standard body appearance is considered to include the OEM grille and badge.
b) OEM spoilers and wings, and aftermarket wings and spoilers are permitted. OEM side skirts may be used if they were available on the car from the dealer provided they meet the minimum ride height rule. Aftermarket side skirts may be used provided that they meet the minimum ride height.
No openings/ducts in them other than for jacking insert(s), are no wider than the approved fascias, do not extend any higher than the bottom of the door and do not reinforce the chassis.
c) Body and frame seams, and joints, may be welded, but additional reinforcing material/brackets are not permitted. The OEM radiator supports may be replaced, or reinforced, in order to make

[11] Stock induction: As factory equipped, modifications allowed as per current WCMA rules.
[12] Forced induction: as factory equipped only. No change in boost level is permitted.
[13] Aftermarket forced induction: modified stock turbo/super charger or larger than stock on a factory manifold. Also includes custom turbo / supercharger systems.
[14] Wankel: An engine with no pistons
[15] 2 valve: Each cylinder has only one intake and one exhaust valve.

repairs easier. The radiator supports shall not reinforce the rest of the chassis, or diminish the OEM crush zones. Tube Framing is strictly prohibited.

d) Bumper brackets may be modified, but bumpers must remain in OEM locations.
e) Non-essential body items and trim may be removed including attaching brackets and supporting structure. Any holes in bodywork exposed by the removal of these items shall be covered up, or filled in.
f) All of vehicle's doors must be able to be opened from both inside and outside of the vehicle. Latches and hinges for the doors may be modified, but must remain in working order. Aftermarket latches and hinges may be used but shall not protrude beyond outer surface of bodywork. Latches and hinges for the hood and trunk/decklid are not required to be used. If latches and hinges are not used on the hood, or trunk/decklid, a minimum of four (4) pins shall be used to secure the body panel(s).
g) Two (2) hood pins, equally spaced across front of hood, are required within 24" of the leading edge of the hood.
h) Openings in the bodywork may be temporarily covered, wholly or partially, with tape for purpose of regulating airflow. Bodywork openings may be more permanently closed-off using close-out panels mounted behind body opening. Bodywork seams may not be taped at all. Bodywork may only be taped to temporarily secure it after contact/accident.
i) All bodywork and windows shall be sufficiently rigid, adequately supported, and properly secured such that it does not noticeably flutter, move, or deform while vehicle is in motion.
j) **Fender flares are permitted if original equipped at factory or for decorative or rust repair purpose. The tire used must still fit in the stock opening (as per existing rules). The competitor must be prepared to prove the flare is for this purpose only[16].**

4 - Chassis

a) All cars shall have the OEM rear package structure and/or rear seat back support structure installed if applicable. As an alternative, a metallic close out panel may be installed that would simulate the rear package shelf and/or the rear seat back support structure if applicable. If a close out panel is used to clean up the appearance of the rear package shelf and/or rear seat bulkhead in conjunction with the OEM structure, the close out panel material is free.
b) Cables, wiring and lines may be replaced, rerouted, and/or protected.
c) When applicable, two (2) steel, 360-degree loops of sufficient strength must be located as close as possible to the front and rear universal joints to prevent the driveshaft from dropping in case of failure of either universal joint. Floor materials and cross members may also be utilized to provide this protection.
d) It is permitted to attach a plate, or pad, under the car to provide for jacking of the car, provided it serves no other purpose. It is prohibited to install any kind of device, which protrudes from the rocker panel or side of the car. However, tubes may be attached to the roll cage, or chassis, and extend to the inner surface of the rocker panel, or bodywork, and act as a receptacle for a jacking fixture.
e) Minimum ride height is FOUR inches (4"). Ride height will be measured from the lowest part, or component, of the car, excluding suspension, and complete wheels.
f) The OEM firewall between the cockpit and engine compartment shall be intact to prevent the passage of flames from the engine compartment to the cockpit. Any holes in the firewall must be of the minimum size for the passage of controls and wires, and must be completely sealed.
g) Both front windows, driver's and passenger's, shall be down (preferably removed) whenever the vehicle is on track. The OEM window opening on the front doors shall not be filled in with any material, other than the material required to mount a NACA-duct for driver cooling. If used, the NACA-duct shall be mounted in the front, lower, corner of the window opening. The area closed off to mount the NACA-duct shall not exceed 50 square-inches. In rain conditions, a quarter window larger than 50 square-inches may be used in the area normally used to mount the

[16]**Competitors found using this rule to gain advantage with the use of larger tires is not fair to other competitors and may be penalized.**

permitted NACAduct, in an attempt to minimize the amount of water entering the cockpit. Enough open area for the driver to exit through in an emergency shall remain open at all times.

h) All vehicles must use a stock,OEM equivalent, safety glass windshield, mounted in the stock location, at the stock angle and maintaining the stock profile. Using stock installation methods/adhesives and moldings (i.e., urethane). If not installed in this method window clips are mandatory,
i) Windshield clips, Windshield Clips/Rear Window Straps, as per GT regulation are permitted and recommended. Required if window not installed using OEM installation method and materials.
j) Side windows and rear windows may be replaced by clear Lexan-type plastic material having a minimum thickness of 3mm (1/8”), but must retain the same shape, size, and location as the original glass. NACA-ducts may be mounted in the side windows. The rear window must be secured by two (2) additional straps (25mm wide x 3mm thick),securely fashioned to the body at both the top and bottom of the rear window. If a DOT spec glass rear window is used in conjunction with the OEM method of mounting, safety straps are recommended, but not required.
k) Lexan Windows may be mounted and sealed with silicone/sealant. Any silicone/sealant used to bridge the gap between the perimeter of the window and the chassis shall be neat in appearance and uniform in thickness. Tape may only be used to seal the windows during wet track sessions for the purpose of reducing the amount of water entering the cockpit.
l) OEM side window framework shall be intact.
m) Acrylic, or glass, removable/moveable roof panels must be replaced with the same material as the surrounding roof. Replacement of roof panel components must be of a permanent style, All brackets, mounts,and moldings may be removed. Fabric tops are not permitted, and shall be removed along with all associated hardware. It may be replaced with an OEM hardtop if one is available.
n) Unused mounting tabs and brackets that are non-structural, excluding the rear seat back support and package tray, may be removed.
o) The floor pan may be modified to provide clearance for the exhaust system routing.

5 - Engine

a) Alternate engines may be used, given that the manufacturer of the vehicle and engine are the same (e.g. Acura engine installed into a Honda auto).
b) The crankshaft shall be a stock *OEM part *or aftermarket as long as it is of identical dimensions and material* as the OEM part for the specific engine, but may be tooled enough to achieve balance.. The standard weight reduction allowance for balancing of the crankshaft is 0.5 lbs. The standard weight reduction allowance for the balancing of the reciprocating assembly is 15 grams. Alternate connecting rods are permitted.
c) Crankshaft pulleys and belt drive systems are free
d) Blocks may be sleeved to repair cylinder walls. Engines may be bored.
e) Rocker arms, lifters, followers, pushrods, valve springs, keepers retainers, guides, seats, and valves are free, TITANIUM is NOT permitted, except for valve retainers. The head may be machined to fit valvetrain components. Valve lift is limited to .600”. Camshafts and timing is free.
f) Cars produced with an electronic throttle body may use the OEM electronic throttle body. The OEM electronic throttle body may be converted to manual actuation and the actuation cam on a manual throttle body may be changed to alter the opening/closing rate of the butterfly
g) The ignition system components may be replaced freely provided that the type of ignition remains the same as stock.
h) Engine calibration (spark and fuel) is free. A programmable ECU is permitted. The RPM limit set within the engine management system shall be the same for all gears (i.e. 1st gear shall not have a lower RPM limit than 2nd-6th gears).
i) Fuel injector(s) and fuel rail(s) must maintain the original number and mounting location(s), but are otherwise free. Fuel pumps and fuel filters are free in type, size and number.
j) ~~**Intake manifold type and style unrestricted.**~~ Type and style of intake to remain stock for year make and model of engine, unless noted otherwise. Boring of the throttle body is permitted.

Switching to individual throttle bodies and carburetors prohibited unless fitted as factory equipment.

k) The location and type of the fuel pressure regulator(s) are free provided they are mounted within the engine compartment *or the OEM location.*
l) The ring gear diameter must be the same as the production flywheel. Flywheels shall be ferrous metal, or aluminum, but are otherwise free. Titanium flywheels are not permitted. Clutch and pressure plate design is free. Flywheel lightening is permitted
m) Oil pan and oil pickup may be baffled, modified, or replaced to prevent surge. OEM oil pump may be modified, or replaced with an OEM-style oil pump. Dry sump systems may be installed
n) Vents, breathers, and oil filters may be added, or substituted. All emission control devices may be removed and the resulting holes plugged.
o) Replacement gaskets and seals are free, including head gaskets. Replacement gaskets and seals must be made out of material(s) designed to seal the parts of an engine. Replacement gaskets and seals may not perform any other functions. Head gaskets may be used to adjust compression ratio.
p) The intake and exhaust ports may be ported unless otherwise noted. The valve guide may be machined as part of this porting. The intake manifold may be port matched to the head(s).
q) OEM Style Variable cam timing (VTEC, VANOS, etc.) and OEM Style variable length intake manifolds may be partially, or wholly, disabled. Variable cam timing systems that use multiple cam lobes for each valve(s) may remove lobes from the camshaft(s) that are not being used.
r) In order to increase the compression ratio, the bottom of the head may be machined. Alternate pistons are permitted and/or the pistons may be machined. Compression is limited to 12.0:1.
s) Cars utilizing forced induction may not have a boost controller within reach of the driver. Competitors must be prepared to demonstrate the boost adjustment process to officials.
t) Carbureted vehicles may use an alternate carb of the same design and configuration (e.g. a single barrel may be replaced with the an alternate single barrel but not a dual) Same number of barrels and type of carb as vehicle was manufactured.

6 - Cooling Systems

a) Water Cooling Provided that the stock method of cooling is retained, the cooling system is free, including cooling fans, but the water radiator must remain in the approximate OEM location. The mounting angle may be changed.
b) Engine Oil Cooling Coolers for the engine oil are free in number, type and location.
c) Intake Air Cooling Cars utilizing forced induction may install intercoolers. The number, type, and location of intercoolers are free.
d) Water Spray Systems Water may not be sprayed on any intercoolers, radiators, brakes ,etc.
e) The cooling system must be a closed system or its overflow lines must run to a two (2) quart minimum capacity catch tank separate from the oil catch tank.

7 - Exhaust System

a) Any exhaust manifold or header may be used. Any muffler may be used. The maximum permissible noise level as measured 16 m (50 feet) from the side of the track surface is 108 dBA, subject to local track regulations. If fitted, catalytic converter(s) may be removed.
b) Exhaust system must terminate outside the bodywork of the car,behind the drivers seating position.

8 - Drivetrain

a) Alternate differential housings are permitted,OEM mass produced components only. Differential may be open, locked, or of a limited-slip type. The internals of limited-slip type differentials may be modified to change the amount of slip limiting. Differentials with external, or electric,

adjustability are prohibited. Driveshaft and half-shafts may be aftermarket, but shall be the OEM-type and use the same types of materials as stock.

b) Vent and/or breather lines may be added to transmission and/or differential. One (1) transmission and one (1) differential cooler is permitted.

9 - Fluid Piping, Fuel Tank & Fuel Requirements.

a) Fuel Cells/Tanks: The use of a fuel cell is required unless the stock fuel tank is located between the axle centerlines and within the main chassis structure (i.e. frame rails, etc.). When fuel cells are added their capacity shall not be any greater than the original production fuel tank plus (+) 10%. Additional straps and/or protection may be required. All fuel cells MUST comply with GT Fuel Cell Specifications. Proper bracing to protect the fuel cell in the event of a rear-end crash is required. If a fuel cell is installed in the rear hatch/rear trunk area, the OEM floorpan in that area may be replaced with metal in order to make it easier to mount the fuel cell and close out the area around the fuel cell. There must be a metal bulkhead completely separating the cockpit from the compartment containing the fuel cell. This does not negate the requirement that the fuel cell bladder be contained in a metal container.
b) Readily available pump fuel is mandatory. Ethanol blended fuels are allowed, up to 10%. Race gas not permitted. Nitrous Oxide not permitted. No other alcohol based fuel is permitted. It is the competitor's responsibility to prove fuel used is legal.
c) There must be a metal bulkhead completely separating the cockpit from the compartment containing the fuel cell. This does not negate the requirement that the fuel cell bladder be contained in a metal container.
d) No line containing engine coolant may pass through the cockpit. No hydraulic fluid lines may have removable connectors inside the cockpit.
e) Coolant catch tanks are required.
f) All fluid hoses, lines, reservoirs, and tanks that are in the cockpit, or cargo area that is open to the driver, shall be separated from the driver by rigid metallic and/or non-metallic enclosures and/or deflection shields to prevent fluid from spraying on the driver in case of a leak. Waterproof flexible wraps may also be used to prevent fluid from spraying on the driver. The floor of these enclosures, or the area under the deflection shields, shall be designed to prevent the accumulation of fluids.
g) Cooling of fuel is prohibited. This applies equally, whether the fuel is in the car, or not.

10 - Oil System

a) If oil storage tanks are not located in the original position they must be surrounded by a 10 mm thick crushable structure. Provided that the oil tank is not located in close proximity to the outer surface of the bodywork, and there is some of the structure of the vehicle between the oil tank and the bodywork, the car’s structure will meet the 10mm crushable structure rule.
b) If the oil tank is located in the cockpit area, or a trunk area that is open to the driver, it must be separated from the driver by a metal enclosure made up of .036” steel, or .059” aluminum. This is in addition to the 10mm thick crushable structure. The floor of the enclosure must be designed to prevent accumulation of fluids.
c) Engine oil breather system and or Oil catch tank is required
d) Accusump-type systems may be used.

11 - Electrical System

The electrical system is free provided that:

a) The battery may be replaced. Battery may be relocated, but must be secured by a tie-down bracket and positive terminal must be covered to prevent accidental sparking. Mounting as per GT regulations.

b) Exposed headlights, parking lights, and side marker lights shall be taped or removed entirely, provided that the resulting openings are covered in a suitable manner to prevent air passage. OEM light assemblies mounted on or below (but not in) the bumper shall be removed, and all resulting holes shall be covered to prevent air passage through said holes. Fog/driving lights, parking lights and associated attaching hardware may be removed. The resulting openings may be used to duct air, or be filled/covered. Any ducting may not extend beyond the outer surface of the bodywork.
c) Whenever the track surface is wet, thereby causing spray, all cars on the track shall turn on their tail/rain lights. The brake lights must continue to be functional whenever the tail/rain lights are used. The tail/rain lights must be dimmer than the brake lights are when they come on, unless amber turn signal lamps are wired as rain lights.
d) Each car must be fitted with at least one effective windshield wiper motor, which must be in working order throughout the event. Wiper blades, arms and associated hardware may be substituted freely, or removed.
e) Each car must have an effective defogging/demisting system that is capable of keeping the windshield clear during wet sessions. Anti-fog films meet this requirement.

12 - Suspension and Steering

a) The use of active suspension is forbidden. All suspension members must be made from a metallic material(s). Chromium plating of suspension members is forbidden.
b) Suspension springs are free. Coil-over units may be added to supplement, or replace, OEM springs. Attaching points may be reinforced. It is permitted to use threaded spring seats for adjustability.
c) Shock absorbers and struts are free. Driver adjustable systems,or electronically controlled shocks, are not permitted. If a reservoir/adjustment canister is used, only one may be used per shock. The shocks at each individual wheel may not be connected in any way.
d) Stabilizer bars are free, and may be added, removed, or substituted. Driver adjustable stabilizer bars are not permitted.
e) Suspension components shall be the stock OEM pieces, but they may be reinforced. Heim joints are permitted on suspension components. Standard suspension bushings may be replaced with solid, or spherical, bushings.
f) Alternate control arms permitted.
g) Any anti-roll bar(s) and rear axle traction bar(s), rear axle panhard rod and watts linkage can be added or substituted, provided its/their installation serves no other purpose. The mounts for these devices can be welded or bolted to the car. These devices and their mounts can not be located in the trunk or driver/passenger compartment unless fitted as stock. Rear axle traction bar(s) used to control axle housing rotation must be solid bar or tube.
h) When a car's anti-roll bar also acts as a suspension locating device,the bars attachment points and pivot points on the chassis and suspension control arms must remain in the stock location.
i) Slotted plates may be added over original shock mounts on front and rear shock towers for camber/caster adjustment. One bolt-in brace may connect the front strut towers, and one bolt-in brace may connect the rear strut towers.
j) The spindle and/or outer joint on the a-arm and/or strut may be moved in order to correct bump steer caused by changing the vehicle ride height.
k) All steering components, with the exception of the steering wheel, column and tie-rods/toe-links, must be original equipment supplied by the manufacturer. These parts may be strengthened provided the original part can still be identified.
l) The steering wheel may be replaced with an aftermarket, or racing steering wheel. Wood-rimmed steering wheels are not allowed. An all-metal quick release coupling on the steering wheel may be added.
m) A collapsible steering column shall be used. Most current OEM steering columns have at least two (2) universal joints in them that would allow the steering column to fold on impact. This type of design (at least one (1) universal joint) must also be used in any steering column extension(s) that may be used to reach the driver's competition seating position.

n) Power steering may be disconnected, an OEM or aftermarket steering rack for that model may be fitted, an electric power steering pump may be fitted, or an OEM electric-assisted steering rack may be used.

13 - Brakes

a) Brake lines may be relocated, and rubber lines may be replaced with armored brake lines. Original equipment master cylinders and pedals may be replaced. Hand brakes may be removed. Aftermarket brake proportioning valves are allowed. Non-pressurized brake fluid lines and master cylinders need not be metal, metal shielded, or bulkheaded. Pressurized brake fluid lines must be metal, metal shielded, or bulkheaded.
b) Brake pad friction material is free.
c) Backing plates and dust shields may be modified, ventilated, or removed.
d) Brake duct inlets incorporated in the front spoiler as standard, or light openings, other than headlights, may be used to duct air to the front brakes. Additionally, brake ducts may be fitted into intermediate mounting surface of allowed splitter.
e) Wheel fans are not permitted.
f) Power assisted braking systems are permitted.
g) The balance of braking forces between the two wheels on an axle shall be equal and non-adjustable.
h) The balance of braking forces between the front and rear axles may only be adjusted by the driver through:
- Direct intervention on the position of the center of the joint, on the linkage lever of the hydraulic pumps of the front and rear circuits.
- Direct intervention on a proportional valve, in which the intake pressure is adjusted through a pre-loaded spring.
i) Brake calipers, whether OEM or aftermarket, shall be mounted in stock location. Brake discs whether OEM or aftermarket are unrestricted.

14 - Tires & Wheels

Tires

a) DOT approved passenger vehicle tire with an appropriate speed rating that exceeds the potential speeds of their vehicle must be used. Racing, recapped or re-grooved tires are not allowed. Tire size is unrestricted. The only modification allowed to tires is having treads "shaved" or "trued".
b) Tire size is free.
c) Filing, buffing, or any other disguising of tire sidewall is prohibited. Chemical treatments, or any means to artificially enhance tire performance is prohibited.

Wheels / Hubs

d) Loose wheel spacers of any type are not recommended.
e) All cars must run the same size wheel on the same axle.
f) Lug nuts and/or wheel studs are free as long as at least two (2) threads of the wheel studs are visible and the outside edge of the nuts and studs are inside the wheel rim when properly mounted.
g) As viewed from above at the centerline of the wheel; the fender shall completely cover the “tread” portion of the tire. Only the tire sidewalls may be visible.
h) The wheel material is free, but they must be constructed of metallic material(s). No modifications (including grinding) are allowed on a vendor-supplied wheel.
i) Valve stems and caps are free.

15 - Cockpit

a) In-car cameras must be securely mounted to the roll cage or vehicle structure.

b) The following items must be removed from the cockpit: Tool kit, spare tire, supplemental restraint systems (SRS) and passive restraint systems.
c) The following items may also be removed:
- Headliner, sun visor, carpeting, carpet pad and/or insulation, soundproofing, OEM seats, all trim except the dashboard, heating and air conditioning systems, window winding mechanisms, central locking systems, audio system, and any other systems fitted to the original car solely for the comfort of the driver and/or passengers.
d) The following items may be installed in the cockpit::
Safety equipment/structures, seat, controls necessary for driving, instrumentation, electronic equipment, radio, camera, battery, driver cooling system, driver ventilation system, replacement door panels/interior trim, anti-sway bar controls (not within reach of driver). None of the above items may hinder cockpit exit.
e) The above components shall be attached/contained to the chassis in such a way as to be able to withstand 25-g deceleration. Any sharp edges shall be covered, padded, protected, etc. to prevent injury to driver, crew, course workers, and officials.
f) Seat Location – The chassis shall not be modified to make additional clearance for the driver's seat. The driver's seat shall be located in the same lateral location as the OEM seat. The driver's seat shall be located longitudinally so that the seat back, at the driver's shoulders, does not break an imaginary vertical plane located at the front of the rear seat platform. On 2-seat vehicles the seat back may go back to the OEM rear bulkhead, package tray, etc. It is recommended that the floor be reinforced in the areas where the seat is mounted to the chassis. Vehicles with a non-metallic floor shall add tubing elements, with a minimum wall thickness of .090", connecting metallic parts of the chassis, or within the cage structure, to mount the seat to.
g) Stock dash/instrument panel cover (dash pad) must be used. Original instruments/gauges may be replaced, or supplemented,with additional engine monitoring gauges. Accessories, lights and switches may be added or removed. Box-type extensions from the dash pad may be used to mount switches and controls, in the areas where the OEM insert panels were mounted, so that they more easily accessible to the driver. Audio and video systems may be removed.
h) Vertical bulkheads, and enclosures, within the cockpit shall not be any higher than the bottom of the side windows, and shall not extend more than 457mm (18") above the floorpan. No bulkhead(s) shall cover the rear footwells.
1. Sedan Body (4-door) & Hatchback Body (3-door) - Any bulkheads positioned in front of the plane determined by the OEM rear seat back shall not extend laterally from one side of the chassis to the other, but rather shall only be large enough to cover the individual components necessary.
2. Coupe Body (2-door) - Any bulkheads positioned in front of the plane determined by the OEM rear seat back, if applicable, may extend laterally from one side of the chassis to the other.
i) DASH PAD MODIFICATION – It is permitted to modify the dash pad in order to run the roll cage tubes through the dash area as long as the dash pad is modified only enough for roll cage fitment. If necessary, the dash pad may be parted to ease installation around roll cage. Any such parting shall be done in such a way as to minimize the appearance that they have been separated once pieces of dash pad are installed.

16 - Aerodynamics

a) A front splitter may be added that does not extend more than 2.0 inches past the original, or approved, bodywork as viewed from above for the entire profile of the splitter. Splitters shall not extend laterally any further than the widest point of the outside sidewall of the front tires with the wheels pointed straight ahead, and the "dry" set-up on the car. Additionally, the splitters may not extend more than 50.8mm (2.0") beyond the bodywork, regardless of where the outside edges of the front tires are. The splitter shall consist of a single flat plane. The splitter shall have no vertical deviations, fences, etc., unless they are part of the production bodywork for street use. Splitter designs may incorporate openings for brake ducts provided it does not affect the standard body appearance. The allowed splitter may close out the underbody from the leading edge of the approved bodywork, back to the centerline of the front axle. The splitter may be mounted to the

front fascia via a vertical intermediate mounting surface. Additionally, a maximum of four (4) rods, or cables, may be used to support the front, and/or sides, of the splitter. No other material(s) may be used external to the body to support the splitter. Singleplane vertical close-out panel(s) may be used to bridge gap between front fascia and splitter.

b) A rear wing may be added. Each wing shall be mounted to trunk/deck lid with two (2) mounting brackets. The wing, and the portion of the mounting brackets located externally to the trunk/deck lid, may only be reinforced by a diagonal strut having no aerodynamic effect, and/or by affixing the external parts of the brackets to internal parts of the brackets within the trunk/ cargo area. The internal parts of the brackets may protrude through the trunk/deck lid to allow for the two parts of each bracket to be fastened together. The rear wing, including any wicker bill, shall be mounted level with, or below, the peak of the roof. The trailing edge of the rear wing may be mounted no further rearward than the rear, center-point of the approved bodywork. The wing and endplates shall not be any wider than the widest part of the bodywork, not including mirrors and fender flares/lips. The rear wing is limited to a single element with a chord length of 12” and a width no wider than the widest part of the car, not including fender flares and mirrors,or a max width of 72”, whichever is the lesser. A wicker may be added provided it does not cause the wing/wicker assembly to exceed the stated maximum dimensions.

SECTION 5 - CHALLENGE CAR REGULATIONS

Challenge Cars are 1979-85 Mazda RX-7's as described below. This class allows limited modifications, in order to put more emphasis on driver skill over car selection and preparation.
Only modifications SPECIFICALLY stated in these rules are allowed- no other modifications are acceptable. IF A MODIFICATION IS NOT STATED IN THESE RULES, IT CAN NOT BE DONE.

1 - Make of Car

First generation Mazda RX-7 cars, from model years 1979-85, equipped with a 12A engine. Only S, GS or GSL models are eligible.-

2 - Body

Permitted body modifications are listed below:

a) The interior of the car may be gutted, including removal of all carpet, all insulation, seats and centre console. Dash instrumentation must remain in place, as well as top of dash across whole car.
b) Doors may be gutted only if two anti-intrusion bars are fitted, per Appendix 1 of these Regulations.
c) Window glass may be removed from doors.
d) Driver seat must be replaced with a racing seat meeting applicable standards
e) A strap-type window net is required as per Appendix 5
f) A roll cage as per Appendix 1 of the WCMA Technical Regulations – Race, must be fitted. Roll bar padding around driver is mandatory. Bracing forward of the drivers compartment is prohibited, with the exception of strut tower braces.
g) Minimum 5 point racing harness as per Appendix 4 of the WCMA Technical Regulations - Race is required.
h) A removable steering wheel may be installed.
i) Front air dam and rear spoilers are permitted.
j) Fiberglass body panels allowed if conforming to stock shape.
k) Fender openings may be modified to allow for tires.
l) Mirrors are free but must remain in stock locations.
m) Removal of front headlights / motors is allowed, although headlight covers must remain stock in appearance.
n) No non-stock holes may be made in any body panels. All cars must retain original stock appearance, with allowance for after-market air-dams, rear spoilers, and fender openings.
o) Windshield must remain stock. Windshield clips may be added.
p) Plexiglass main rear window allowed.
q) Hood pins are allowed.
r) Emblems and side moldings may be removed.
s) Cars may be painted as desired. Bodies must always be in good repair and presentable.
t) Any decals required for sanctioning bodies and sponsors must be placed in required positions.
u) Whenever the track surface is wet, thereby causing spray, all cars on the track shall turn on their tail/rain lights. The brake lights must continue to be functional whenever the tail/rain lights are used. The tail/rain lights must be dimmer than the brake lights when they come on, unless amber turn signal lamps are wired as rain lights.

3 - Suspension

The following are the only permitted suspension modifications.

a) Camber/Castor plates or slotting the strut towers to increase negative camber and to adjust castor are allowed.
b) Suspension Bushing kits are allowed but must remain within the stock dimensions.
c) Front and Rear shock tower braces are allowed. (bolt on or weld in)
d) Front and rear shocks are unlimited
e) Only stock suspension arms may be used.
f) Only stock anti-sway bars may be used. The rear sway bar may be removed.
g) Front coil over kit with springs are allowed. Front and rear spring rates are unlimited.
h) Spec tire**s are the Toyo R888 in size 205/60/13 with OEM 13" x 5.5" wheels or Toyo RR in size 205/50/15 with 15" x 7" wheels. Both wheel sizes have 4 x 110 bolt pattern.**
i) Wheel spacers up to 5/16 inch are allowed on **both** axles.
j) A Watts Link Bracket reinforcement, part number MZ-1-WATT, may be installed.

4 - Engine

a) The only permissible engine is a Mazda 12A. Street porting is allowed. Emission control equipment may be removed. All engine components must remain stock unless otherwise stated.
b) Intake manifold must remain stock.
c) Stock flywheels only, lightweight flywheels not allowed
d) Any original type spark plug may be used.
e) Oil cooler system is unrestricted.
f) Drive pulleys are unrestricted.
g) Radiator may be replaced with any radiator that will fit the stock location.
h) An original and operating radiator fan must be in place.
i) Fuel lines are unrestricted, however the return line must remain stock.
j) The stock fuel check valve must not be bypassed.
k) Fuel cells are allowed, provided they do not exceed the capacity of the stock RX-7 gas tank and comply with the SCCA/FIA FT3 standard.
l) Grose Jets may be used in place of the stock pieces.
m) Racing gas is prohibited. The only fuel allowed is gasoline generally available to the public at service stations.
n) Air filter is unlimited. Ducting air to the air filter is allowed, providing no additional holes are made in bodywork. Ducted air may come from in front of radiator, through existing holes in air dam, or through signal light holes in front bumper.
o) A screen may be mounted in front of the radiator and oil cooler to prevent stone damage to these components.
p) Battery must weight minimum 24 pounds and may be relocated. If the battery is relocated it must be enclosed in a ventilated and insulated box.
q) The electrical charging system must be functional and working at all times.
r) Ignition coils must be stock and must mount in the stock location.
s) Engine and drive train lubricants are unrestricted.
t) The stock fan may be replaced with an electric fan in the original position
u) A Carter P4594 fuel pump may be used in place of stock fuel pump. A fuel pressure regulator and a fuel pressure gauge may be used within the fuel line to maintain pressure.

5 - Brakes

Only stock brakes as fitted to 1979-1985 Mazda RX-7 S, GS or GSL models are permitted.

a) GSL-SE brakes are specifically excluded.

b) Modifications to the braking system are allowed as below:
c) Brake pad material is unlimited.
d) Braided steel brake lines may be used.
e) Adjustable brake bias valves are allowed.
f) Front and rear dust shields may be removed.
g) The inner plastic fender wells and splash guards may be modified or removed.
h) Brake ducting is allowed to a maximum diameter of 3".
i) Rear brake lights must be operating.

6 - Drive Train

a) Clutches are unrestricted, provided the replacement is the same weight as the original .
b) Only original equipment 1979-85 Mazda RX-7 differentials are allowed.1979-85 Mazda RX-7 S or GS models with rear drum brakes may be upgraded to a rear-end assembly from a 1979-85 Mazda RX-7 GSL. (disc brakes and limited slip differential. Welding differentials is not permitted.
c) Stock wheel lug bolt system may be replaced with lug studs and nuts.
d) Only the stock transmission and differential gearing and gear ratios are permitted.

7 - Exhaust

a) A Racing Beat-type header (2 to 2) may be used.
b) The exhaust system must extend to the rear bumper. The exhaust system must remain outside of the passenger compartment
c) A muffler must be used. Maximum sound level must be in accordance with existing track limits .
d) Maximum exhaust pipe diameter 2-1/8" on primary tubes.

8 - Weight

a) Minimum weight is 2350 pounds with driver and fluids.
b) If ballast is needed to bring a car to minimum weight it must be securely bolted to the passenger side floor.

9 - Radio Communication, Onboard Timing & Data Acquisition

a) Any two-way "voice only" communications may be used only between driver and crew.
b) Radio communications between drivers during a race or other track session is specifically prohibited.
c) Onboard timing systems are allowed. Onboard timing systems, if fitted, can only be used by the driver. Transmission of data between the car and the pits is prohibited.
d) Data acquisition systems of any type are prohibited.

SECTION 6 - OPEN WHEEL DEFINITION

An open wheel racing vehicle is defined as a purpose-built racing vehicle having a single seat, and open wheels (no wheel or suspension fenders).

For the purpose of classification, open wheel vehicles will be grouped into the following classes:

Formula Libre
Formula F1600
Formula Continental
Formula Vee

SECTION 7 - FORMULA LIBRE DEFINITION

A Formula Libre vehicle is an open wheel purpose-built racing vehicle that does not meet Formula F1600, Formula Continental or Formula Vee requirements. Firewall, floor pan, and other safety items must meet the standards described in the F1600 regulations. Other components are unrestricted. The class designation for Formula Libre will be a letter L or the characters FL, displayed adjacent to the racing number on the sides of the vehicle.

SECTION 8 - FORMULA 1600 REGULATIONS

F1600 is a set of specifications that prescribe the requirements for a single seat, open wheel racing vehicle using a production based Ford 1600cc of a crossflow, pushrod configuration of the type supplied in Ford Cortina GT automobiles.
These vehicles will be equipped with safety equipment including firewalls, floors and other equipment described elsewhere in this set of regulations.
This class is intended to be restrictive in nature. As such, allowable modifications are only those outlined in this section of the regulations. Unless a change in specifications is stated in this section it is specifically NOT authorized. There is deemed to be no room for interpretation of these regulations by competitors or builders.

1 - Engine

1.1. General

a) The engine to be used in this class shall be one of the two following configurations of the Ford 1600 GT engine known as the 'Kent' pushrod, crossflow design:

b) Original Style: Cortina 1600 GT produced through to 1970
Uprated Style: Cortina 1600 GT produced from 1971 on

c) Components will not be interchangeable between the two styles of engines unless specifically authorised in these regulations. Unless there is a specific mention of the engine style affected, all of the following regulations apply to both styles. There will be no modifications, alterations or changes allowed to any components in the engines or chassis unless specifically authorized by these regulations.

d) The gasket face of the cylinder head may be resurfaced provided that the maximum compression ratio is not exceeded and the minimum depth of the combustion chamber is maintained.

e) Valve guides are not restricted providing that a change in valve guide does not change the original position of the valve. Standard replacement valves with oversize stems may be used as part of normal rebuilds or maintenance. Dimensions as shown elsewhere in this rule book, must be maintained. Valve seats maybe re-cut or replaced. Valve seat angles are not restricted.

f) All exhaust emission control equipment must be removed. This includes air pumps, associated lines and nozzles. Where the air nozzles are removed the resulting holes must be completely plugged.

g) All moving parts of the engine may be balanced provided that this balancing does not remove more material than is necessary to accomplish the balance. All parts of the engine may be polished providing that the original shape and contour of the part is unchanged and that it can be recognized as the original part.

h) Maximum Compression Ratio

i. Original Engine - 10.0 to 1
Uprated Engine - 9.3 to 1

i) The following allowances are made when determining the compression ratio:

i. Original Engine:
ii. 1.64 cc - Top ring to top of piston
iii. Uprated Engine:
1.33 cc - Top ring to top of piston
0.30 cc - Volume of valve protrusion

iv. Both Engines:
4.75 cc - Head gasket

j) Minimum Unswept Volumes:
i. Original Engine:
ii. 44.4 cc - with standard pistons
45.1 cc - with .030 o/size pistons
iii. Uprated Engine:
iv. 48.2 cc - with standard pistons

1.2. Block

a) The bore may be enlarged to provide clearance between the cylinder and piston.
b) Cylinder liners may be fitted to correct oversize piston clearance.
c) The top surface of the block may be surfaced to provide the maximum allowable compression ratio.
d) Any steel center main bearing cap may be used in place of the standard cast part.
e) The oil pump mounting surface may be machined to provide for the mounting of an oil pump.
f) The cylinder block used in Ford Pinto automobiles, Part No. DIFZ-6010-C, may be used as a replacement for the Cortina GT block. The standard Pinto lifters, Part Nos. DORY-6500-A and DIFZ-6500-A, may be used as replacements when this block is used.

1.3. Cylinder Head

a) Ports may be reshaped by the removal of metal as long as the port dimensions at the manifold face of the head do not exceed those listed elsewhere in this rulebook.
b) Exhaust Port Dimension - 2.83 cm (1.113") Minimum cross section.
c) Combustion Chamber - Original Engine Only
a. Minimum Depth: 0.29 cm (0.115")
Maximum Length: 8.00 cm (3.15")
Minimum Volume/Cylinder: 7.8 cc
d) Reshaping of the combustion chamber is prohibited.
e) The standard head gasket shall be used. Head gaskets may be interchanged between styles of engines.
f) Ford Pinto cylinder head, Part. No. DORY-6049-B is permitted as a replacement of the Cortina GT engine.

1.4. Intake Manifold

a) The ports may be reshaped through the removal of metal providing the following dimensions are maintained:

Maximum size at head face:

	Original Engine	Uprated Engine
Cylinder 1 & 4	3.76 cm X 3.25 cm (1.48" X 1.28")	3.15 cm (1.24")
Cylinder 2 & 3	3.175 cm (1.25")	3.17 cm (1.25")
Maximum Size at Carburettor Flange	7.77 cm X 3.53 cm (3.060" X 1.389")	
Maximum Length	9.65 cm (3.80")	
Primary Choke and Radius	1.80 cm (.709")	
Secondary Choke and Radius	1.99 cm (.787")	

b) The carburettor face of the inlet manifold may be machined to the horizontal to compensate for the tilt of the engine in a fore/aft plane.

c) The diameter of the ports on the uprated engine may exceed the listed dimensions providing the casting bore is untouched and in its original state.

d) The water passages in the inlet manifold may be plugged.

1.5. Pistons

a) Standard 0.038 cm (.015") over size or 0.076 cm (.030") oversize pistons may be used in the original engines only. Uprated engines are required to use only standard size pistons.

b) Pistons may be from any manufacturer but must meet all dimensions as listed in the following section and must be same material and construction as the original Ford parts.

c) The following piston dimensions must be observed:

	Original Engine	Uprated Engine
Maximum Diameter Standard:	8.10 cm (3.189")	8.10 cm (3.189")
0.038 cm (0.015") o/s:	3.204	Not Permitted
0.076 cm (0.030") o/s:	8.176 cm (3.219")	Not Permitted
Depth Of Bowl (+/- 0.013 cm (.005")):	1.27 cm (0.500")	1.27 cm (0.500")
Minimum Volume Of Bowl:	31.50 cc	
Maximum Diameter Of Bowl:	5.78 cm (2.28")	
Centreline Of Wrist Pin To Crown (+/- 0.005 cm (.002")):	4.41 cm (1.737")	4.41 cm (1.737")
Overall Height:	8.38 cm (3.30")	8.38 cm (3.30")
Minimum Weight With Rings And Pins:	573 grams	555 grams
Weight of Pin (+/- 2 grams):	115 grams	115 grams

d) Piston rings are unrestricted as to make and material except that there must be one oil control and two compression rings on each piston and no modification is made to the piston to allow for the installation of the rings.

1.6. Valves

a) The following dimensions must be observed:

	Original Engine	Uprated Engine
Distance Apart At Centers:	3.91 +/- 0.05 cm (1.540" +/- .020")	3.91 +/- 0.05 cm (1.540" +/- .020")

Maximum Diameter:		
Inlet:	3.815 cm (1.502")	3.962 (1.560")
Exhaust:	3.180 cm (1.252")	3.403 (1.340")
Overall Length:		
Inlet:	10.87 cm +/- 0.015 cm (4.280" +/- .006")	11.09 cm +/- 0.05 cm (4.367" +/- .020")
Exhaust:	10.82 cm +/- 0.015 cm (4.260" +/- .006")	11.06 cm +/- 0.05 cm (4.355" +/- .020")

b) Reshaping the valves is specifically prohibited.

1.7. Camshaft

a) The camshaft lobe profile shall not be provided for checking purposes. The following specifications will be used to check the profile of the camshaft to determine its legality.

Lobes, heel to toe:	
Inlet:	3.329 cm (1.311") maximum
Exhaust:	3.332 cm (1.312") maximum
Lobes, base circle radius:	
Inlet:	1.371 cm (0.540")
Exhaust:	1.384 cm (0.545")
Lift at top of pushrod:	
Inlet:	0.586 cm +/- 0.005 cm (0.231" +/-.002") maximum
Exhaust:	0.589 cm (0.232") +/- maximum
Lift at top of spring cap:	
Inlet:	0.904 cm (0.356") maximum
Exhaust:	0.909 cm (0.358") maximum

b) Reshaping of the valve stem contact pad of the rocker arm is permitted provided the maximum lift at the spring cap is not exceeded.

c) Offset camshaft drive dowels are permitted.

d) Camshaft lobe centers and profiles shall be checked using the official procedure available from WCMA.

1.8. Valve Springs: Valve springs and shims may be replaced with those from any source providing that no more than one spring per valve is used and standard spring caps and retainers are used. Maximum standard cap diameter is 2.78 cm (1.096").

1.9. Pushrods

a) The following pushrod specifications must be observed for both styles of engine:

i. Minimum Stem Diameter - 0.635 cm (0.25")
Overall Length - 19.41 cm (7.64") minimum
Minimum Weight - 50 grams

1.10. Connecting Rods. Minimum weight (both engines) including cap, bolts and small end bushing, but not big end bearing shells: 640 grams.

1.11. Crankshaft

a) The following specifications for the crankshaft must be complied with:

i. Weight (minimum):
Original Engine - 23lbs. 8oz. 10.6596 kg.

Uprated Engine - 24lbs. 8oz. 11.1132 grams
Stroke At Piston: 7.762 cm +/- 0.010 cm (3.056" +/- .004")

ii. Any crankshaft pulley may be used.
iii. The crankshaft is interchangeable between engine styles.
iv. The crankshaft may be shotpeened.

1.12. Flywheel

a) Flywheel weight with ring gear and dowels (minimum):
   i. Original Engine - 18lbs.
   Uprated Engine - 20lbs.
   ii. Machining the flywheel to achieve minimum weight is permitted. Locating dowel pins may be installed.
   iii. The standard Ford Pinto flywheel may be substituted for the original part on either engine provided that machining to meet minimum weight regulations retains the standard profile.

1.13. Carburetor

a) The standard carburettors as supplied on the original engines will be used. Those carburettors are as follows:
   i. Original Engine:
   ii. Weber 32 DFM or DFD or Holley 5200
   Uprated Engine:
   iii. Weber 32/36 DGV or Holley 5200
   Venturi Diameter - Both Engines (maximum)
   iv. Primary 26mm
   v. Secondary 27mm
b) Any jets may be substituted provided that they may be fitted in their original positions in the carburettor without any modifications to the carburettor body.
c) The external throttle linkage(s) may be modified.
d) Internal or external anti-surge tubes may be fitted.
e) Air cleaners may be removed or substituted with those of any origin and a velocity stack may be fitted instead of or in addition to these air cleaners.
f) The choke linkage and butterflies may be removed.
g) Carburettor gaskets may be replaced with those of any origin provided that they are the same dimension and thickness as the original part.
h) On carburettors where the fuel inlet fitting is a swaged or press fit type, this fitting must be removed and replaced with one which is threaded. The body of the carburettor will be drilled and tapped to accept this threaded fitting.

1.14. Any fuel pump may be used.

1.15. Any Exhaust manifold may be used, provided that the outlet is no more than twenty four inches from the ground and that the system terminates no more than 6 inches past the bodywork.

1.16. Oiling systems may be either wet or dry sump style, and oil pans of any origin or material may be used.

1.17. Cooling Systems

a) Radiators, fans and water pumps may be of unrestricted origin.

b) Any method of drive and the necessary pulleys may be used for the water pump, fan or generator.

1.18. Electrical Equipment

a) The distributor must be the standard Motorcraft or Autolite item or one from Bosch or Lucas that can be fitted to the engine and driven by the normal camshaft gear without modification of any other component of the engine.
b) Only the standard breaker point method of spark trigger shall be used. Electronic ignition or crank firing of the ignition is specifically prohibited.
c) Ignition timing may only be controlled by vacuum or mechanical means within the distributor itself. Remote timing changes are not allowed.
d) The distributor advance plate may be fixed by being soldered, welded or bolted down with suitable fasteners. The vacuum advance unit may be removed.
e) The advance curve may be modified through the use of any advance springs.
f) Generators and/or alternators are not required.
g) All other electrical equipment is unrestricted in origin.

1.19. Miscellaneous

a) The front engine cover may be modified or replaced with another of unrestricted origin.
b) The following components may be replaced with those of unrestricted origin providing their use does not require the modification of any other engine component:
    i. Nuts, bolts, screws, washers or any other fasteners.
    ii. Gaskets and seals except for head, carburettor to manifold, and intake manifold to head gaskets.
    iii. Engine bearings of the same type and size as original parts. Normal over/under sizes are permitted. Modification of the standard bearing area is not permitted.
    iv. Spark plugs.
c) A mechanical tachometer is permitted.
d) The crankcase breather may be modified or removed.
e) The rocker cover may be modified to allow for crankcase ventilation and the filler cap may be modified or replaced.
f) The rocker cover may replaced by one of any origin or material providing the replacement offers no function not provided by the original part.
g) The main bearing caps may be treated with salt bath nitriding covered by SAE spec AMS 2755A (tuftriding, etc.).
h) Any oil or lubricants may be used.
i) Exhaust systems may be constructed of any material.
j) The outlets of all exhaust systems must not extend more than 60 cm (23.62") beyond the rear axle centreline. The outlet must be more than 30 cm (11.81") and less than 60 cm (23.62") from the ground. All exhaust systems must end outside of any body work.
k) Any single plate clutch may be used providing no changes to the flywheel are made other than altering the attachment points for the clutch to flywheel bolts.

2 - Transmission

a) Any transmission may be used providing it has no more than four forward gears and an operational reverse gear.
b) Any final drive unit may be used providing that:
c) Drive shall be to the rear wheels only.

d) The differential is not modified in any way to limit its normal function. Torque biasing, limited slip or locked differentials are specifically prohibited.

3 - Chassis

Sections labelled '**A**' apply to vehicles built after January 1, 1986. Sections labelled '**B**' apply to vehicles built prior to January 1, 1986.

a) Frame

i. **A** - The chassis must be of steel frame construction. Monocoque structures are prohibited. Stabilized (honeycomb) or composite (carbon fibre or Kevlar) materials are specifically prohibited except as authorised by specific sections of these rules.
ii. The frame shall incorporate a roll cage structure with forward facing braces. Additional forward facing braces shall extend from the front roll hoop to the front bulkhead. The front bulkhead is the furthest forward transverse section of the main frame structure.
iii. The frame will be designed such that the soles of the competitors feet are positioned behind the forward edge of the front wheel rims. The competitor will be seated with pedals not depressed. At no time will the competitors feet move ahead of the front bulkhead.
iv. The lower main frame rails must be a minimum of 25 cm (9.84") apart, inside dimension, from the front bulkhead to the rear roll bar hoop.
v. **B** - The chassis must be a steel space frame. Monocoque style frames are prohibited.

b) Crush Structure

i. **A** - There shall be a crushable structure, securely attached to the front bulkhead, with a minimum cross section of 200 sq. cm (31 sq. in.). This structure will end a minimum of 40 cm (15.74") ahead of the clutch and brake pedals, in their normal, non-depressed position. The structure will be constructed of a minimum of 18 gauge 6061-T4 aluminum or equivalent. Radiators may be a part of this structure.

c) Anti-Intrusion Devices

i. **A** - The area between the upper and lower main frame rails extending from the front roll bar hoop bulkhead to the rear roll bar hoop bulkhead must be protected from intrusion into the cockpit area by one of the following methods:
ii. Panel(s) made of either 0.15 cm (.060") heat treated aluminium (6061-T6) or equivalent or 18 gauge steel attached to the outside of the main frame rails.
iii. Reinforced body consisting, at minimum, of a double layer, 5 oz. bi-directional, laminated Kevlar material incorporated into this area of the body only. The Kevlar area of the body shall be securely fastened to the frame.
iv. For either method, fasteners shall be no closer than 15.24 cm (6") on centre and provide no stress bearing function. The materials used for chassis braces in this area will be at least the same dimension as the roll hoop brace material.

d) Floor Pan

i. **A/B** - A stress bearing floor pan/under tray, of a minimum 0.15 cm (.060") heat treated aluminium or 18 gauge steel, is required extending from the front bulkhead to the rear roll hoop bulkhead.
ii. The floor pan shall not exceed 1 inch in curvature.

iii. The sheet material may be attached to the frame by any method. These attachments must be closer than 15.24 cm (6") on centre in order to qualify as stress bearing panels.
iv. Stabilized or composite materials may not be used for this panel.
v. The front roll bar hoop or dashboard; and rear roll bar hoop bulkheads may also be covered with a stress bearing panel as outlined above.
vi. No other stress bearing panels are permitted.

e) Firewall

i. **A/B** - The firewall portion of the rear roll hoop bulkhead panel must extend the full width of the cockpit. It must extend from the lowest portion of the chassis to a height at least equal to a height of the top of the carburettor.
ii. Forward facing openings may be made in the firewall for the purpose of delivering air directly to the engine compartment. These ducts or any others in the cockpit area must be designed in such a way as to prevent the passage of flame or other debris to the cockpit area.

f) Brackets

i. **A/B** - Brackets for mounting other components to the chassis (eg. engine mounts, suspension mounts) may be of any material or shape and may be fastened to the chassis in any safe manner.

g) Bodywork

i. The bodywork opening giving access to the cockpit will have the following minimum dimensions:
ii. Length - 60 cm (23.6")
Width - 45 cm (17.7")
iii. This width must extend over a length of at least 30 cm (11.8"). This opening may exist anywhere forward of the firewall. Forward facing roll bar braces and padding will not be considered in these measurements.
iv. The competitors seat must be capable of being entered without the manipulation or removal of any body panel.
v. Bodywork, including fuel tanks, will not exceed a maximum width of 95 cm (37.40"). The bodywork may not extend more than 60 cm (23.6") past the centreline of the rear axle.
vi. Bodywork will not increase in width behind the rear axle centreline in any horizontal plane.
vii. There will be no forward facing gaps in the bodywork except those to allow for engine cooling, engine air intake, brake and/or shock cooling.
viii. Wings and airfoil devices which have a principal effect of creating aerodynamic downforce are prohibited. An aerofoil is defined as any device or part of a car (excluding normal and conventional styled bodywork) which has the principal effect of creating downforce. Within this definition may be included forward facing gaps or openings in the bodywork, but shall not include spoilers in the form of raised surfaces continuous with the body surface and not wider than the body surface.
ix. A single rear spoiler may be attached and may have provision for adjustment. This adjustment may not be made from the cockpit. This spoiler may be no wider than the bodywork surface to which it is attached and may not have a forward facing gap between itself and the bodywork surface to which it is attached.
x. All bodywork must be firmly attached to the chassis.
xi. No part of the bodywork or rear spoiler will exceed a height of 90 cm (35.4") from the ground. This measurement is taken with the competitor on board and the

vehicle as raced or qualified. The roll bar/cage structure and the engine intake air box are not included in this measurement.

xii. The effect of these rules is to limit the use of ground effects to achieve aerodynamic downforce.

xiii. The bottom surface of the vehicle, as licked by the wind shall not deviate more than 2.54 cm (1") in its horizontal plane at any longitudinal point behind the front axle and ahead of the rear axle. This does not mean that a belly pan is required behind the rear roll hoop bulkhead.

xiv. No aerodynamic devices, such as skirts, may extend more than 1 cm (0.39") below the lower surface of the floor pan behind the front axle.

xv. Seat buckets and other protrusions will not circumvent this rule.

xvi. Air may not be ducted through the body or any other part of the vehicle for the purpose of providing aerodynamic downforce.

xvii. All air ducted for use by heat exchangers, must pass through those heat exchangers.

xviii. Fuel filler necks, caps or lids will not protrude outside of the bodywork of the vehicle.

xix. Fuel cell or tank vents must be located at least 25 cm (9.84") to the rear of the cockpit opening. Fuel vents may not vent through the roll bar structure.

h) Suspension

i. The suspension system of the vehicle consists of springs, shock absorbers, control arms and other various links and swivel joints that support the vehicle through its axles. Sway bars, their links and steering components are not considered as suspension parts.

ii. All suspension parts will be constructed of steel. Exceptions to this are hubs, hub carriers, bearings and bushings. Vehicles manufactured after January 1, 1983 must have hub carriers that are made of only steel or aluminum.

iii. Springs must be manufactured of steel only.

iv. Shock absorbers can be of any make or manufacturer and of any material.

v. Control arms and all associated parts which attach directly to the chassis must have their mounting points designed and manufactured in a manner which will prevent their intrusion into the cockpit area.

vi. Spoilers, fairings or other devices which may exert downforce may not be attached to moveable suspension members.

vii. If the suspension arms themselves are streamlined or of an airfoil cross section, they must be symmetrical about their horizontal axis.

viii. All components not defined as chassis, frame or suspension may be of unrestricted origin unless specifically restricted by these rules.

ix. Titanium may not be used for any part of the vehicle.

x. Brake lines may be attached to suspension components.

i) Brakes

i. Brakes may be derived from any source providing cast iron brake calipers and rotors of ferrous material are used.

ii. Forward facing brake cooling ducts may be installed providing they serve no other purpose.

j) Wheels

a. Wheels may be of unrestricted origin except that:

i. material is free but must be metal.

ii. diameter must be 13 inches.

iii. rim width is not more than 5.5 inches at the bead seat.

iv. wheel covers, fans or any other method of fairing in the wheel may not be used.

k) Weight

a. Minimum weight for the vehicles will be taken as the vehicle leaves the track following qualifying sessions or races with competitor in place and wearing all of the normal competitor's equipment. The minimum weight for the vehicles is as follows:
   i. Vehicles with outboard suspension - 1075 lbs.
   ii. Vehicles with inboard suspension - 1125 lbs.
   iii. Vehicles with mixed suspension styles - 1100 lbs.

l) Tires

a. Tires will be: Goodyear R600 slick:
   i. Front: 20 X 6 X 13
   Rear: 22 X 7.5 X 13
   ii. Rain tires may be of any manufacture provided they are threaded tires and conform to the same dimensions as the slick tires.

SECTION 9 - FORMULA CONTINENTAL

Formula Continental is a set of specifications that prescribe the requirements for a single seat, open wheel racing vehicle using a production based Ford 2000cc SOHC NE engine with a 2-venturi carburettor of the type supplied in the Ford Pinto/Mustang/Capri automobiles.
These vehicles will be equipped with safety equipment including firewalls, floors and other equipment described elsewhere in this set of regulations.
The class is intended to be restrictive in nature. As such, allowable modifications are only those outlined in this section of the regulations. Unless a change in specifications is stated in this section it is specifically **NOT** authorized. There is deemed to be no room for interpretation by competitors and builders.

1 - CHASSIS

a) The chassis shall be of tubular steel construction. Monocoque chassis construction is prohibited.

b) Stress bearing panels are defined as sheet metal affixed to the frame by welding or bonding or by bolts screws or rivets located closer than 155.4mm center to center.

c) Cars shall have a complete metal floor within the Driver Compartment which shall be a stress-bearing panel, rigidly supported, and of adequate strength. Its curvature shall not exceed 25.4mm.

d) The mountings for brake and clutch pedals and cylinders, and for the instrument panel and the bulkhead behind the driver may be stress bearing. No other stress bearing panels including body panels are permitted.

e) Cars shall have a protective bulkhead of non-flammable material between the driver and the engine compartment capable of preventing the passage of fuel or flames in the case of a fire. Gaps shall be sealed with a fireproof material.

2 - AERFOILS AND SPOILERS

a) See drawing and table of dimensions herein (Section 6.23 WCMA Technical Regulations)

b) AEROFOIL: Any device or part of a car (excepting normal and conventional styled bodywork), which has a principal effect of creating aerodynamic downforce. Within this definition should be included forward facing gaps or openings in the bodywork, but will not include spoilers in the form of raised surfaces continuous with the body surface and not wider than the body surface. It is not permitted to mount aerofoils on un-sprung parts of the car.

c) SPOILER: Any device (splitter, trim tab etc.) other than an aerofoil, added to a car to divert airflow to create an aerodynamic advantage.

d) No part of the safety rollover structure higher than 900mm from the ground shall be shaped so as to have an aerodynamic influence by creating vertical thrust.

e) It is not permitted to construct any suspension member in the form of an asymmetrical aerofoil or to incorporate a spoiler in the construction of any suspension member. Symmetrical streamlining of suspension members is permitted.

f) All cars built after January 1, 1986 shall conform to the “flat bottom” regulation, requiring that, between the rear edge of the complete front wheels and the front edge of the complete rear wheels, all sprung parts of the car visible from directly beneath the car shall lie in one plane with a tolerance of +5mm. All of these parts shall produce a uniform, solid, hard rigid (no degree of freedom in relation to the body/chassis unit) impervious surface, under all circumstances. The periphery of the surface formed by these parts may be curved upwards with a maximum radius of 50mm. No part having an aerodynamic influence and no part of the coachwork may under any circumstances be located below a geometrical plane generated by the plane surface designated above.

3 - BODYWORK

a) See Section 6.23 of WCMA technical Regulations Contained herein.

b) All cars shall be fitted with bodywork including a driver compartment isolated from the engine, wet batteries, gearbox, transmission shafts, brakes, road wheels, fuel tanks, oil tanks, water header tanks and catch tanks.

c) All cars shall have positive and secure fastenings for all bodywork and detachable parts.

d) Skirts, bridging devices or any form of aerodynamic device between the chassis/coachwork and the ground are prohibited. Any specific part of the car influencing its aerodynamic performance shall comply with rules relating to coachwork, be rigidly secured in the entirely sprung part of the car, and remain immobile in relation to the car.

4 - SUSPENSION

a) All parts shall be of ferrous material, with the exception of hubs, hub adapters, hub carriers, bell cranks, pivot blocks, bearings and bushings, spring caps, abutment nuts, anti roll bar links, shock absorber caps bolts and nuts.

b) Springs shall be of steel.

5 - BRAKES

a) Calipers and rotors shall be of ferrous material.

6 - SHOCK ABSORBERS

a) Shock absorbers shall have bodies of steel or aluminum alloy.

7 - STEERING

a) Steering is unrestricted.

8 - WHEELS

a) Wheel diameter is 13in with maximum front width of 6in and rear of 8in.

9 - CATCH TANKS

a) Oil catch tanks shall be fitted to the engine and crank case breathers venting to the atmosphere in such a way as to prevent oil from spilling on the course. Required minimum capacity is 1 litre. Catch tanks shall be made of either a translucent material or include a transparent panel or gauge in order to facilitate checking its contents. Catch tanks shall be readily capable of being emptied.

10 - FUEL SYSTEM

a) Though not required it is recommended that all cars be required to be fitted with a WCMA approved fuel cell. Other jurisdictions may specify a fuel cell.

b) The maximum capacity shall be 41.00 litres.

c) Fillers and caps shall not protrude beyond the bodywork or be situated within the driver compartment. The cap shall have an efficient locking action.

d) Air vents shall be at least 250mm to the rear of the cockpit and shall be fitted with an anti spill check valve.

11 - WEIGHT

a) The minimum weight, including driver and required safety equipment shall be 540kg (1190 lbs).

12 - MISCELLANEOUS

a) The use of titanium is prohibited.

b) The use of composite materials using carbon and/or Kevlar reinforcement is prohibited.

c) The use of magnesium for bulkheads is prohibited.

13 - STARTER

a) Cars shall be equipped with a self starter

14 - ENGINE

a) Permitted Engines

i) The engine shall be:

(1) The Ford NE series, 2-litre SOHC engine

(2) All blocks shall contain casting number HM6015BA, HM6015AA, HM6015BB, HM6015AB, HM6015DA or HM6015AD.

(3) The nominal dimensions will be: bore 90.84mm and stroke 76.95mm.

(4) Production tolerances are permitted providing the total swept volume does not exceed 2000cc.

b) Cylinder Head (Including valves, valve gear & camshaft)

i) It is permitted, as a means of repair, to replace damaged seats by replacement cast iron valve seat inserts, and valve guides may be replaced with cast iron or bronze, all to standard dimensions.

ii) Non-standard camshaft covers are permitted providing they in no way improve the performance of the engine. Water passages are not permitted in the cam cover.

iii) Standard valve spring retainers shall be used. Only single valve springs are permitted. Shims are permitted. Valve springs are otherwise unrestricted.

iv) Camshafts must be from Ford Motor Company, or Crower Part # E-57553 FF2000. An alternate optional camshaft, Elgin part # 2000FC, may be used.

v) The rockers shall remain entirely unmodified. They shall be fully manufactured and ground as supplied by the Ford Motor Company. Alternate manufactures may be used as long as the original materials and dimensions remain the same as OEM.

vi) Regrinding camshaft lobes is permitted as long as the camshaft lobe center is 122° ± 2°.

vii) Tuftriding or Parkerising is permitted.

viii) The key/keyway in the camshaft pulley may be offset. Alternately an adjustable camshaft sprocket which retains the same number of teeth and pitch with the stock sprocket may be used.

ix) Maximum valve lift at determined points by camshaft rotation will be determined with zero tappet clearance. Either standard springs or substitute low rate springs may be used at the scrutineers' discretion.

The following table gives the valve lift in mm, angle measured from point of max lift.

Standard Camshaft

	Inlet		Exhaust	
Angle	Opening	Closing	Opening	Closing
0	10.442	10,442	10.442	10.442
5	10.360	10.360	10.360	10.360
10	10.110	10.110	10.110	10.110
15	09.690	09.690	09.690	09.690
20	09.110	09.110	09.110	09.110
30	07.450	07.450	07.450	07.450

40	05.170	05.170	05.170	05.170
50	02.590	02.580	02.580	02.590
60	00.860	00.810	00.810	00.860
70	00.540	00.430	00.430	00.540
80	00.370	00.190	00.190	00.370
90	00.200	00.010	00.010	00.200

Alternate Camshaft

	Inlet		Exhaust	
Angle	Opening	Closing	Opening	Closing
0	11.182	11.182	10.149	10.149
10	10.853	10.821	9.831	9.829
20	9.821	9.721	8.854	8.826
30	8.177	7.955	7.205	7.154
40	5.960	5.624	4.920	4.866
50	3.425	3.010	2.346	2.380
60	1.278	0.994	0.722	0.825
70	0.344	0.307	0.385	0.524
80	0.134	0.130	0.224	0.404
90	0.022	0.024	0.090	0.279

x) Valves may be of Ford manufacture or Ferrea part numbers VSOIN200 and VSOEX2000.

(1) No reprofiling or polishing is permitted.

(2) The original 45-degree seat angle shall be retained.

(3) Regrinding the seat face within service limits, as defined in the Ford Service Manual, is permitted. The distance between the valve centres and the angles of the valves shall not be altered.

Maximum face diameter inlet:	42.20mm
Maximum face diameter exhaust:	36.20mm
Overall length inlet:	111.15mm (+/-0.5mm)
Overall length exhaust:	110.55mm (+/- 0.5mm)
Maximum valve stem diameter	8.40mm

xi) It is permissible to reshape inlet and exhaust ports by removal of metal within limits. Addition of material in any form is prohibited. Maximum port dimension at manifold head face: inlet diameter 39.5mm, exhaust 35.5mmx27mm.

xii) An external oil drainpipe from the cylinder head is permitted. The fitting of a union by drilling and tapping is permitted.

c) COMPRESSION RATIO

i) The maximum compression ratio will be controlled as follows:

(1) Minimum cylinder head combustion chamber volume 49cc (not including head gasket). Polishing and/or tooling of the cylinder head to achieve only the required combustion chamber volume is permitted.

(2) Standard Ford gasket; minimum thickness 0.90mm, minimum diameter of cylinder aperture 92.00mm.

(3) Pistons shall not protrude above cylinder head surface at TDC.

d) PISTONS

i) The following combinations are permitted, unmodified in any way except for balancing as detailed herein.

(1) Mahle piston P/N 80HM6102LA with rings, pin and connecting rod with bolts, without bearings. Minimum weight = 1332.50 grams

(2) Mahle piston P/N 85HM6102DA with rings, pin and connecting rod with bolts, without bearings. Minimum weight = 1240.00 grams.
Note: This piston may have either casting #90V108 or #90V118.

(3) JE piston P/N M-6102-B200 with rings, pin and connecting rod with bolts, without bearings. Minimum weight = 1240.00 grams.

(4) AE Hepolite piston P/N 21426 with rings, pin and connecting rod with bolts, without bearings. Minimum weight =1240.00 grams.

(5) CP piston P/N IV 2.0 LTR with rings, pin and connecting rod with bolts, without bearings. Minimum weight = 1240.00 grams.

ii) Piston rings are unrestricted provided that:
(1) One oil control and two compression rings are used.
(2) No modification is made to the piston for the installation of the rings.

iii) To achieve balance, material may be removed from the internal surfaces at any location below the lowest point of the gudgeon pin.

iv) All external surfaces, dimensions and profiles shall remain standard with the exception of the top surface of the piston crown, which may be subject to simple machining to achieve balance and the objectives of 6.14.c.i.3.

e) CONNECTING RODS

i) Connecting rods may be standard Ford, Cosworth, Oliver or Crower. The approved Crower part numbers are SP93230B- or SP93230PF-4. Any rod bolts may be used. Floating piston pins may be used. Standard rod length must be 5.00 inches (+0.005” – 0.010”)

ii) Tuftriding, Parkerizing, shot-peening, shot-blasting and polishing are permitted.

iii) It is permitted to radius the area around the big end retaining bolt heads and nuts. Big end bolts P/N 905500 are permitted.

f) CRANKSHAFT

i) A standard crankshaft shall be used. Spot machining, to achieve balance is permitted. Tuftriding, Parkerizing, shot-peening, shot-blasting and polishing are permitted. Crankshaft minimum weight is 12.5kg (27.5lb).

ii) It is not permitted to alter the number of bearings or fit bearings of less than standard production width.

iii) Standard oversize and undersize bearings are permitted. This does not allow reducing the bearing surface by reducing the width of standard bearings.

g) CYLINDER BLOCKS

i) It is permitted, as a means of repair, to replace damaged cylinder bores with cast iron cylinder liners, all to standard dimensions.

ii) Localized machining of the cylinder block is permitted to allow fitting of the dry sump system.

iii) The crank case breather may be altered or removed, but all breathers shall discharge into a catch tank directly or indirectly.

iv) The cylinder block may be machined to establish correct deck height.

h) GENERAL ENGINE

i) Engines shall be mounted upright and aligned fore and aft in the chassis.

ii) The addition of any material be it metal, plastic or composite, etc. by any means be it welding, bonding, encapsulation, or encasement to any component is prohibited. However specific repairs of castings may be allowed with the written approval of the WCMA Chief Scrutineer.

iii) Balancing of reciprocating and rotating parts is permitted only by removal of material from locations so provided by the manufacturer.

iv) Pump, fan and generator (alternator) drive pulleys and their retention bolts, washers and belts are unrestricted.

v) Mechanical tachometer drives may be fitted.

vi) Generators or alternators are optional.

vii) The use of non standard replacement fasteners, nuts, bolts, studs, screws and washers which are not connected with or which do not support any moving parts of the engine or its compulsory retained accessories is permitted.

viii) The use of thread locking compounds is permitted.

ix) Gaskets are unrestricted except for cylinder head and carburettor to inlet manifold gaskets, which shall be standard Ford manufacture for the engine, and inlet manifold to cylinder head gasket which shall not exceed a thickness of 1.1mm.

x) Any process of cleaning may be used providing the surface finish, on any component, which shall remain standard, is not affected.

xi) Only modifications and additions specifically covered in these Regulations are permitted. Engine components not covered by these Regulations shall remain absolutely standard and unmodified. In cases of dispute on engines, references will be made to Ford Company manuals.

15 - INDUCTION

a) A single carburettor shall be used on a standard inlet manifold.

i) Carburettor types

(1) Webber 32/36 DGV or DGAV:

(a) Number of main venture	2
(b) Max diameter of main venture	26.0/27.0 mm
(c) Max diameter of carb outlet to inlet manifold	32.0/36.0 mm

(2) Holley 32/36 Carburettor

ii) Forced induction is prohibited

iii) The air cleaner may be removed or replaced with a trumpet fitted.

iv) It is permitted to change jets, open both throttles together, remove cold start devices and diffuser bar, fit internal and external anti-surge pipes, and remove seals on emission control carburettors.

v) No other modifications are permitted. Chokes shall remain standard and no polishing or re-profiling is permitted.

vi) Carburetor with the swaged fuel inlet fitting shall be replaced by drilling and tapping the carburetor body for a threaded fitting.

vii) Any means of reducing intake air temperature is prohibited. Fresh air intakes are permitted.

viii) Any form of water injection is prohibited.

ix) Flexible mounts for the carburettor may be incorporated providing they do not exceed a maximum of 25.4mm from face to face.

x) Only the standard inlet manifold may be used. The ports may be reshaped by the removal of metal as long as the following dimensions are maintained:

(1) Maximum size at head face	36.50mm
(2) Maximum size at carburettor flange	86.50mm x 40.55mm

xi) The carburettor seat face may be machined to horizontal in the fore aft plane. The diameter of the ports may exceed the above dimensions if the casting bore is untouched and in its original state. The water passages in the inlet manifold may be blanked off or plugged.

xii) Holes in the inlet manifold resulting from the removal of emission/vacuum lines shall be plugged.

xiii) The manifold may be machined externally sufficiently to clear the throttle mechanism case of both throttles being opened together.

xiv) All cars shall be equipped with two external throttle springs for positive throttle closing in addition to those provided by the carburettor manufacturer.

16 - EXHAUST

a) The exhaust system and manifold are unrestricted, within these Regulations.

i) It shall be isolated from the driver compartment.

ii) It shall have no part protruding laterally beyond the plane through the outer edge of the front and rear wheels.

iii) It shall have no part extending rearwards beyond the wing.

iv) The exhaust outlet shall be within 300mm and 600mm from the ground.

v) All exhaust tail pipes shall terminate outside the bodywork.

17 - LUBRICATING SYSTEM

a) The lubricating system is unrestricted. Existing standard production oil ways, linings or oil grooves may be enlarged or reduced but no additional ones are permitted.

b) Localized machining of the cylinder block is permitted to allow fitting the oil pump.

c) Dry-sump is permitted, oil coolers are unrestricted.

18 - COOLING SYSTEM

a) A liquid cooling system is mandatory but radiator and water pump are unrestricted.

b) The radiator, if housed in or incorporating a cool air scoop or deflector, shall comply with bodywork regulations.

19 - FUEL PUMPS

a) Fuel pumps are unrestricted.

b) Fuel pipes and fittings are unrestricted. Fuel cooling radiators are permitted and shall be mounted within the chassis frame.

20 - DISTRIBUTOR

a) Distributors are unrestricted providing they retain the original drive and location.

b) The distributor is defined as the component that triggers the LT, and distributes the HT, current. The ignition timing may only be varied by vacuum and/or mechanical means. It is prohibited to use any other method or component to trigger, distribute or time the ignition.

21 - FLYWHEEL AND CLUTCH

a) The flywheel shall be a standard component or the approved alternate Eliet-001. The minimum weight with ring gear is 4.762kg (10.5lbs). The flywheel may be machined to achieve minimum weight. Spot machining to achieve balance is permitted. Flywheel bolts are free and locating dowels are permitted. A 1600 GT starter ring may be fitted.

b) Any single plate clutch assembly may be used provided that no modifications are allowed on the flywheel other than changing the points of attachment of the clutch to the flywheel.

c) Carbon Fibre clutches are not permitted.

22 - TRANSMISSION

a) The gearbox shall contain not more than four forward gears and include an operable reverse gear, capable of being engaged by the driver whilst normally seated. The ratios are unrestricted.

i) The use of an automatic or sequential gearbox is prohibited.

ii) Electronic assist gear change mechanisms are prohibited.

iii) Gearboxes with shafts that are transverse to the longitudinal axis of the chassis are prohibited. The sole exception are the gearbox final drive (crownwheel) shaft axis and the final drive shafts (halfshafts). All change gears shall be located in the case aft of the final drive.

b) Only rear wheel drive is permitted.

c) The final drive ratio is unrestricted.

d) The differential shall not be modified in any way to limit its normal function. Torque biasing, limited slip and locked differentials are prohibited.

e) Electronically controlled differentials are prohibited.

23 - DIAGRAM AND DIMENSIONS

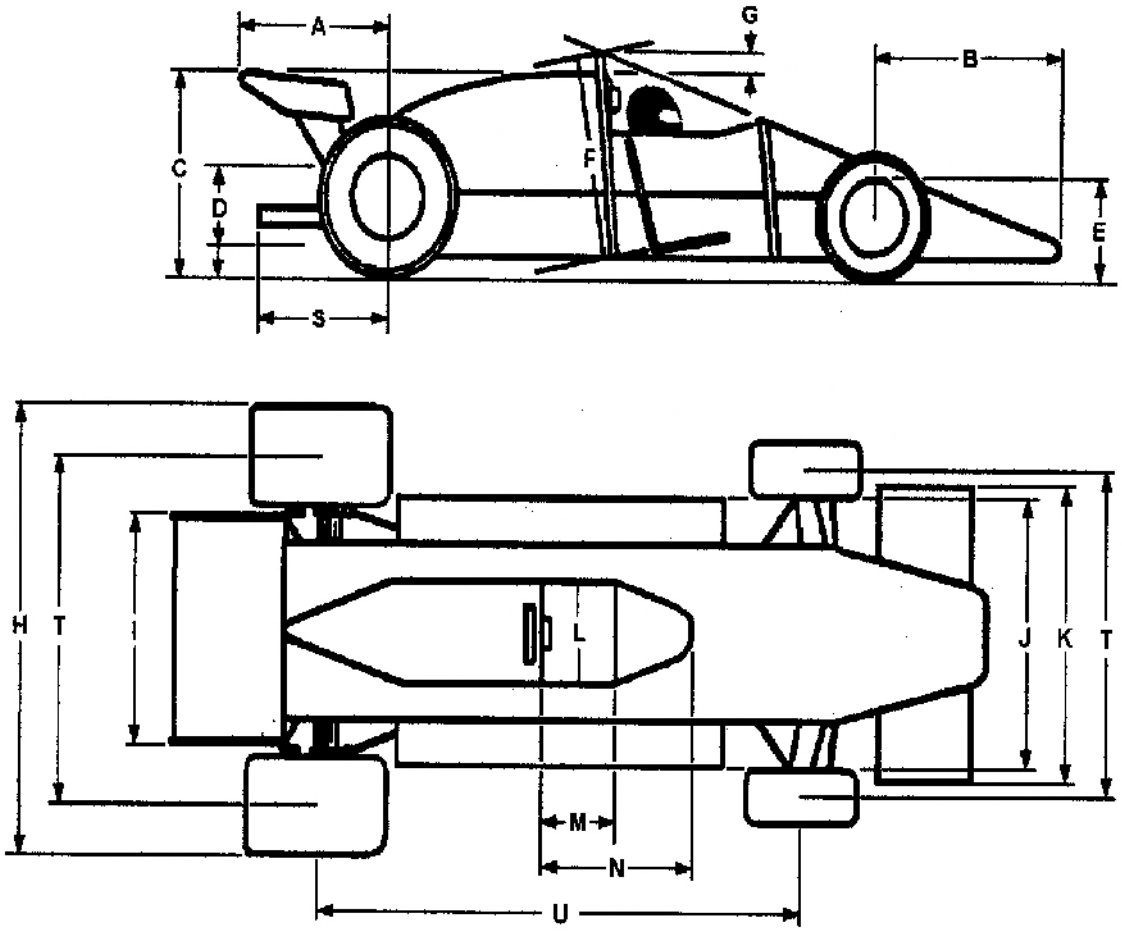
a) Notes

i) Maximum height of the car is measured with the driver aboard.
ii) Maximum height excludes the roll cage on which there is no maximum height.

b) Dimensions
i) Refer to drawing – FC diagram and dimensions
ii) All dimensions are in millimetres.

(A)	Maximum rear overhang from rear wheel axis	800
(B)	Maximum front overhang from front wheel axis	1000
(C)	Maximum height measured from the ground:	900
(D)	Exhaust height measured from ground	300 to 600
(E)	Max height of any aerodynamic device ahead of front wheels:	Rim height
(F)	Minimum main roll bar height in line with drivers spine	920
(G)	Minimum allowed helmet clearance:	50
(H)	Maximum width:	1850
(I)	Maximum rear aerofoil width (includes end plates)	950
(J)	Maximum Body width behind front wheels	950
(K)	Maximum nose width:	1350
(L)	Minimum cockpit coachwork opening:	450
(M)	Minimum cockpit coachwork parallel opening length:	300
(N)	Minimum cockpit overall opening length	600
(S)	maximum exhaust length from rear wheel axis:	800
(T)	Minimum track:	1200
(U)	Minimum wheelbase	2000
	Minimum ground clearance	None

Formula Continental Diagram



SECTION 10 - FORMULA VEE REGULATIONS

A Formula Vee vehicle is a single-seat, open-wheel race vehicle based on standard Volkswagen 1200 series Type 1, U.S. or Canadian model sedan (imported by VW) components.
All vehicles must comply with the applicable current WCMA regulations as well as the following rules.
No component of the engine, power train, front suspension, or brakes may be altered, modified, or changed, nor be of other than VW manufacture, unless specifically authorized by these rules.
External surfaces of the suspension, brakes, and transmission/rear axle may be painted, plated, or anodized.

1 - Weight and Dimensions

a) Minimum Race Weight, including competitor - 1075 lbs.(488.6 kg)
Wheelbase - 207 cm to 212 cm (81.5" to 83.5")
Front track - Standard VW 51.7" / 131 cm (no spacers, shims or adapters)
Rear track - 126 +/- 1.5 cm (49.5" +/- 0.5")
Length - (including exhaust) 312 cm to 323 cm (123" to 127")
Body depth at firewall - 63.5 cm (25")

2 - Suspension

The front suspension and steering shall be standard VW Sedan as defined herein, or an exact replica of the same material and dimensionally identical. The following modifications are allowed:

a) Removal of one torsion bar is permitted.
b) The use of any anti-sway bar(s), mounting hardware, and trailing arm locating spacers is permitted.
c) The use of any shock absorber which can be mounted directly on the standard mounts is permitted. Spring shocks (coil-overs) are prohibited.
d) Relocation of the steering gearbox to any position, utilizing an appropriate mounting structure, and replacement of the tie rods is permitted.
e) The steering column may be altered or replaced and any steering wheel may be used.
f) The use of any desired Pitman arms is permitted. Standard steering arms may be altered; however, no modification of the spindle is permitted.
g) Modification of the standard front torsion bar(s) is permitted.
h) Front bump stops may be completely or partially removed, or may be bent. This modification shall not be used for any purpose other than routing brake lines.
i) Caster and toe in/out settings are unrestricted. Clearancing of carrier or trailing arm to eliminate binding is permitted. Offset suspension bushings are permitted.
j) Front end ride height adjusters may be used provided they are not adjustable from the cockpit.
k) No structure, item or component (including battery) other than bodywork, can protrude further than ten (10) inches from the lower axle beam tube. Any item protruding further than eight (8) inches must include a vertical safety plate. This plate must be constructed of no less than .060" 6061-T-6 aluminum or no less than 16 gauge steel. The plate shall have a minimum frontal surface area of 42 square inches, and shall have a height of not less than four (4) inches and a width of not less than six (6) inches. The plate may have no more than 1/2 inch curvature or deflection from the horizontal or vertical plane, and shall be attached to the chassis (frame) at all four corners. The lower braces shall not exceed a 15-degree upward angle when measured from the horizontal plane of the lower frame tubes.
l) If a vented lead acid battery is mounted in front of the axle beam, it shall be encased in a marine-type container.
m) It is recommended that the front cavity of the nose be filled with foam to aid in impact absorption.
n) The rear axle assembly shall be standard VW Sedan as defined herein with axle location provided by a single locating arm on each side. The rear axle tube may be rotated about its axis.

Coil spring shall provide the primary springing medium, with telescopic shock absorber mounted inside the springs. Optionally, the use of a mono-shock system attached within the bodywork and attached through a bracket mechanism to the rear axle tubes is permitted. If a mono-shock system is used, then the original spring/shock assemblies will be removed. Cables, straps, or other positive stops may be used to limit positive camber. An anti-roll bar or camber control device may also be used. When said anti-roll bar or camber control device is removed, the required coil springs must continue to perform functionally.

o) Wheels shall be steel, EITHER 330mm (13in) by 140mm (5.5in) or 152mm (6.0 in) OR 55mm (14in) by 152mm (6.0in), and a minimum weight of 5.44 kg (12lbs) each. Wheels may be balanced only by the use of standard automotive balance weights (adhesive or clip-on). Hub cap clips shall be removed. Wheel bolts may be replaced by studs of equal strength, permanently installed in the brake drum.
p) The Spec tire is Falkan RT615 in size 195/60R14, Yokohama A032RH in size 185/60R14.

3 - Brakes

a) Brake drums, backing plates, and wheel cylinders shall be standard VW Sedan as defined herein, or an exact replica of the same material and dimensionally identical. Ribbed type rear brake drums (Part No. 113-501-615D or F) may be used in place of the 1200 series rear brake drums.
b) These vehicles shall be equipped with a dual brake system operated by a single pedal. In the case of leak or failure at any point in the system, effective braking power shall be maintained on at least two wheels. Any master cylinder(s) may be used.
c) A separate hand brake (emergency brake) is not required. Removal of the hand brake and operating mechanism is permitted.
d) Two 5/8" holes may be drilled in each backing plate to provide adjustment of brakes. These holes shall not be used for any other purpose.

4 - Engine

a) The engine shall be a standard VW power plant as normally fitted to VW Sedans as defined herein. Any engine part(s) listed by the manufacturer (VW) as current, superseding, replacement parts for the standard VW 1200 Series, Type-1, U.S. and Canada model Sedan and interchangeable with the original parts may be used.
b) Engine components must be assembled in standard configuration. Exceeding the wear limits specified in the VW manual or other VW guides is not prohibited provided that tolerances, dimensions, and specifications stated herein are met.
c) The engine transmission shall be mounted in the chassis with the transmission to the rear.
d) Turbocharging is prohibited.
e) The following component parts may be replaced with that of other manufacture, provided the replacement part is of the same material, is dimensionally identical, and meets all other tolerances and specifications stated in these regulations
    i. Engine case
    ii. Cylinder heads
    iii. Cylinders (an O-ring for centering is permitted).
    iv. Pistons and wrist pins (minimum combined weight without clips or piston rings: 330.0 grams)
        iv.1. Piston material shall be cast aluminum with steel inserts.
        iv.2. Maximum distance from bottom of wrist pin bore to top of #1 (top) compression ring groove: 1.655 inches (20 mm wrist pin bore assumed).
        iv.3. Width of #1 and #2 (compression) ring grooves: .100 +.003 inches or -.023 inches (2.0-2.5mm nominal).
        iv.4. Width of #3 (oil) ring groove: .158 +/- .003 inches (4.0mm nominal).
        iv.5. Wrist pin offset from centerline: .059 +/- .005 inches.

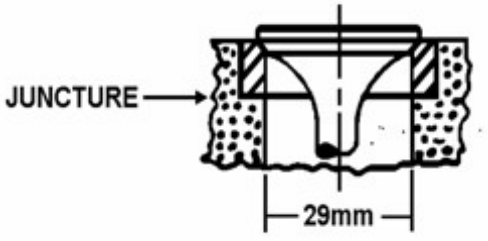
iv.6. Eccentricity of piston below the oil ring groove: .012 +/- .008 inches. Eccentricity shall be defined as the difference between the largest diameter and smallest diameter measured at the same distance from the crown of the piston and below the oil ring grove.

v. Cam followers (minimum weight: 60.0 grams)
vi. Connecting rods with bolts and small end bushing (minimum weight: 425.0 grams)
vii. Oil cooler
viii. Oil pump (exact replica of any standard VW oil pump)
ix. Ignition points or drop-in ignition triggering module (e.g. Pertronix)
x. Distributor
xi. Distributor cap
xii. Fuel pump (Any standard type VW pump which can be fitted without modification to any other part)
xiii. Crankshaft (minimum weight 16 lbs. (7.272 kg)
xiv. Crankshaft gear
xv. Flywheel
xvi. Pressure plate
xvii. Clutch disc
xviii. Throw-out bearing
xix. Push rods
xx. Push rod tubes
xxi. Valve covers

f) The following modifications to the engine and its components are authorised:

i. Removal of the air cleaner and choke mechanism is permitted.
ii. Replacement of the standard exhaust system with any exhaust system terminating 2.5 to 7.5 cm (1" to 3") behind the rearmost part of the body is permitted.
iii. Lightening the flywheel to a minimum of twelve pounds is permitted.
iv. Balancing of all moving parts of the engine, provided such balancing does not remove more material than is necessary to achieve the balance except on those component parts where weights are specified. The crankshaft may be ground and the case may be machined to accommodate the use of standard factory oversize/undersize crankshaft bearings, provided the crankshaft location is not changed.
v. Polishing of the intake and exhaust ports, provided such polishing does not enlarge the intake port beyond 29 mm (1.142 in) inside diameter and the exhaust port beyond 33 mm(1.299 in) inside diameter. The measurements are to be taken at the juncture of the seat insert and the aluminum port material, and at the manifold face. Valve seat angles shall be machined as specified in the official VW Workshop Manual.

Figure 1 Port Measurement



vi. Matching of manifold flanges is permitted.

g) Complete or partial removal of any cooling duct component is permitted. Removal of the fan and the fan housing is permitted. Fan belt origin is unrestricted. The use of a fan belt is optional.

h) Fitting of any standard Solex 28 PCI or 28 PCIT carburettor is permitted. The use of any jets is permitted. Any venturi of standard VW/Solex dimensions, which may be fitted without alteration to the carburettor body, may be used. The venturi must be fitted in the standard position, but its internal diameter may be machined. The carburettor may be rotated 180 degrees about its vertical axis. Modification of the float is allowed as long as no change is made to the float chamber and/or float valve.The carburetor shall remain untouched with the following exceptions:
   i. No material shall be added.
   ii. Bead blasting is permitted for cleaning only.
   iii. The throttle shaft shall be a minimum of 0.185" with throttle plate installed. Machined sides shall remain flat and parallel with no chamfering or radiusing.
   iv. The throttle plate shall be a minimum of 0.053", flat and parallel with no chamfering or radiusing. Diameter shall be a minimum of 1.095".
   v. Carburetor top:- The junction of the bowl and bore may be radiused. The bore beneath the radius shall be a maximum of 1.120". The accelerator pump boss shall remain original. The orifice in the base of the accelerator pump boss shall not allow #56 (0.046") drill bit to pass through i.e. the maximum hole diameter
   vi. Carburetor body: Removal of flashing from internal surfaces is permitted, but no additional material may be removed from the casting in the area of the bore, emulsion tube carrier, or any carrier supports. Bore diameter from throttle shaft down shall not exceed 1.110".

i) The fitting of any standard VW distributor (not restricted to the 1200 series) is permitted. Any non-transistorized ignition coil may be used. Coil location is unrestricted.

j) US imported VW Type 1, 1200 sedan manifold must be used. The heat riser tube and heat sink must be removed. Removal of metal from the interior of the intake manifold and rust-proofing the interior are permitted provided that the following dimensions are not exceeded:
   i. Down Tube: The down tube shall be measured at two different locations within an area between 12.70 mm and 50.80 mm above the horizontal manifold tube. Each measurement shall be taken four times rotating around the circumference of the tube and averaged. Averaged **down** tube dimension shall not exceed 1.140in (2.895 cm) O.D. Removing material from the outside of the manifold to achieve the legal dimension is not permitted. Removal of the manifold down tube from the horizontal tube is prohibited. The original factory furnace bronze attaching process and original factory bronze repair material MAY be visible, inside and outside the manifold.
   ii. Horizontal Tube: The horizontal tube shall be measured at four different locations on each side of the down tube. The area to be measured on each side of the down tube is defined as being between the bend and a point that is 38.10 mm from the center of the down tube connection. Each measurement shall be taken four times, rotating around the circumference of the tube, and averaged. Averaged horizontal tube dimension shall not exceed 25.25mm O.D. These dimensions shall be an average of at least four measurements at equal intervals around the tube at any point. Removing material from the outside of the manifold to achieve the legal dimension is not permitted.

   The tubes making up the manifold must also meet the following requirements:
   ii.1. The minimum bend-to-bend distance is 17.75 inches (Bend-to-bend distance is the distance between points along the horizontal tube where the .994 inch OD, as described above, is first exceeded.)
   ii.2. **At no point in the bends of the horizontal tube may the average O.D. exceed 26.15 mm (1.029") inches. Measurements will be taken four (4) times rotating around the circumference of the tube and averaged.**

ii.3. The maximum carburetor flange height is 22.86cm (9.00 inches) Measurement is to be taken from the intake cylinder head sealing surface with no gasket, to the top center of the carburetor mating flange.

ii.4. Gaskets mating the intake manifold to the intake port shall not exceed 2mm in thickness.

ii.5. Deviation from straight of the horizontal tube between the bends (45.0 cm) may not exceed 6.35mm (0.250") in any direction with the following exception:
A 3" straight edge centered on the bottom of the horizontal tube opposite the down tube should not show a deviation greater than 26.20 mm (0.090") in the bottom of the tube.

iii. The finished, race prepared manifold shall not weigh less than 24 ounces. (680 gm) Intake manifolds may be repaired. Repaired manifolds shall start at 24 ounces BEFORE repair. The addition of excessive material to achieve the minimum weight is not permitted. Manifolds that have not been repaired shall retain the 1.070 inch averages from where the tube exits the 2-hole flange through the entire manifold bend. The area of the 0.250 inch dimension in Figure 1 above is considered to be the average length of the tube where most repairs have been made. This area may vary slightly among manifolds; discretion should be used by scrutineers to determine if the repair is excessive. Inspection of the inside of the manifold in this area will aid in this determination. Enlarging the inside of the manifold and attempting to hide it with repair material is not permitted. The measurement averaging shall start just above the repaired area and continue through the manifold bend.

iv. All exterior surfaces shall be in original condition. Bead blasting is permitted for cleaning only. Manifolds must remain unpainted with color but may have a thin transparent coat of rust proofing material or clear coat type material applied. Removing material from the outside of the manifold to achieve the legal dimensions is not permitted.

v. Matching of manifold flanges (to the ports) is permitted. Seal rings or "gaskets" of any type are acceptable as long as the bottom of the manifold flange is not raised above the cylinder head casting around the port opening. Gaskets mating the intake manifold to the intake port shall not exceed 2mm in thickness. Removal of the manifold flanges that connect the manifold to the cylinder head is prohibited. Factory "VW" casting marks surrounded by a circle and VW casting numbers shall be visible on the bottom side of the flanges, closest to the head. No repair material of any type shall be visible or cover these markings on the bottom of the flanges. Factory furnace Bronze and manifold repair material may be visible where the horizontal tube enters the top of the flange. The exterior dimensions of these flanges must not exceed 2.990" x 1.360".

k) The generator and/or generator stand may be removed. The voltage regulator may be removed.
l) The installation of baffles housed completely within the original oil sump and crankcase is permitted.
m) The use of any oil temperature indicating device in the crankcase is permitted.
n) The use of any standard VW oil pump, or exact replica thereof, is permitted.
o) The use of any valve spring shims is permitted.
p) The following standard dimensions and tolerances of engine components are included for information and shall be observed:

i. Maximum bore: 77.2 cm (3.040")
Stroke: 64 cm +/- 0.1 cm (2.520" +/- 0.005")
Minimum combustion chamber volume: 43.0 cc (Polishing and/or tooling is prohibited.)
Minimum depth from top of cylinder barrel to top of piston: 1.00 cm (0.039")

ii. The above dimensions may be achieved by machining any previously machined surface, providing that the total surface is machined on the same plane as the previously machined surface. The above dimensions shall be the average of all four cylinders.

q) The use of any VW clutch of the same diameter as fitted to the standard VW Sedan as defined herein is permitted. The standard clutch operating arm may be modified to allow its attachment in any appropriate location.

r) An oil sump extension may be fitted utilizing the oil strainer cover plate, provided the extension does not extend horizontally beyond the edge of the oil strainer cover plate and the capacity does not exceed 250 cc. The oil pump pickup pipe may be extended into the sump extension. Accumulators (Accusump) may be fitted.

s) The replacement of oil galley plugs with threaded plugs is permitted.

t) The following dimensions are included for information only and shall be observed:

i. Exhaust valve diameter 25.7 mm or 30 mm
Intake valve diameter 30.0 mm or 31.5 mm
Reprofiling of valves is not permitted

u) The crankcase may be machined to permit the use of standard VW camshaft bearing inserts, provided the camshaft location is not changed. The use of the two-relief valve crankcase (Part No. 111-110-025E) is permitted.

v) A VW camshaft (Part No. 113-109-015D, -017D, -019D, -021D, -023D, -025D, or -027D) or an exact replica of the same material and dimensionally identical, must be used. The maximum lift at the spring collar with zero valve clearance is:

i. with 1200 rocker arms - Intake-- .3340in + 0.000in (8.4836mm)
with 1200 rocker arms - Exhaust--.3165in + 0.000in (8.0391mm)
with 1300/1500 rocker arms --Intake-- .3540in + 0.000in (8.9916mm)
with 1300/1500 rocker arms-- Exhaust--.3365in + 0.000in (8.5471mm)

w) The camshaft profile must match exactly that specified by the official SCCA camshaft plots, plus or minus 0.05 cm (0.002"). It is permitted to regrind the camshaft to duplicate but not exceed the official profile. In doing so, the relationship between the centre lines of peak lift at the exhaust and intake lobes shall remain at 214 degrees 15 minutes, plus or minus 1 degree. The camshaft timing may be changed in relationship to the crankshaft timing by utilizing an offset key at the crankshaft timing gear. The camshaft timing may also be changed in its relationship to the crankshaft by utilizing an adjustable cam gear that retains the existing helical gear thrust angle and that is statically adjustable only (e.g., no dynamic adjustment mechanisms that respond to engine speed changes). Camshaft timing is unrestricted within the restrictions imposed by these rules.

x) Installation of a spark plug hole repair insert is permitted provided that the spark plug centre line is not changed.

y) A single standard automotive oil filter of not more than 1 litre total capacity is permitted and a suitable mounting bracket and bypass valve may be installed. Cooling fins are not permitted on any component. Only flexible, unfinned, 25cm (1.0”) maximum outside diameter oil line with a maximum length of 3.6 m (12’) and suitable fittings may be used. Modification of the lubrication system to facilitate installation of the oil filter is permitted. All components must be contained within the body to the rear of the firewall.

z) Any oil cooler is allowed. A total of 12 feet of maximum 1in O.D. oil line, unfinned, may be used to hook up the oil cooler and the oil filter (rule 6.4.f.xxv). A small section of the fan shroud may be cut away to allow the oil cooler adapter to be mounted on the base pad of the standard oil cooler. Oil coolers shall be mounted completely inside a plumb line extending downward from the outermost edge of the bodywork.

aa) Where minimum weights are specified, any lightening is permissible provided the original part complied with the dimensional restrictions set forth.

bb) Alternate exhaust valves are allowed provided the dimensions and materials are the same as standard (VW) exhaust valves

cc) An alternate oil pressure regulator spring may be used when original oil cooler is replaced with an alternate oil cooler.

dd) Rocker arm wave type spacer washers may be replaced by solid steel type flat washers of suitable thickness.
ee) Rocker arms may be lightened to a minimum weight of 80.0 grams. VW parts shall be used, from 1200, 1300, 1500, or 1600 Type 1 engines; 1:1 or 1.1:1 ratios only..
ff) Valve springs are unrestricted providing:
    i. No more than one spring shall be used per valve.
    ii. The standard spring cap and retainers shall be used.
    iii. Spring shall be made of steel.
gg) Bolt on valve covers may be fitted.
hh) Crankshaft pulley is unrestricted and may be fitted with an oil seal. The engine case may be machined to facilitate the installation of an oil seal.
ii) Rocker arm shafts may be modified or replaced by those of other manufacture, including shafts that replace the stock clips with a solid center spacer and bolt on end caps/washers.
jj) The rocker arm shaft assembly may be shimmed out on the cylinder head mounting studs by placing appropriate shims between the cylinder head mounting boss and the blocks on the rocker arm shaft assembly.

5 - Transmission/Rear Axle

a) The transmission/rear axle assembly shall be standard VW Sedan as defined herein. The synchromesh components must be in place and operating on at least three gears. Reverse gear must be operable from the competitor's seat.
b) The following modifications to the transmission/rear axle assembly are authorized:
c) The installation of any standard VW gear set which can be fitted without modification of any component of the transmission or of the gear set itself, and the transposing of the ring gear to provide proper axle rotation are permitted.
Fully synchromeshed transmission:

Gear	Part No.	No. of teeth	Ratio
1st	113-311-251A	10:38	3.80
2nd	113-311-261	17:35	2.06
3rd	113-311-375	22:29	1.32
	113-311-275B	23:29	1.26
	113-311-275A	23:28	1.22
4th	113-311-341	27:24	0.89
	211-311-341	28:23	0.82
Ring & Pinion	211-517-143A	8:35	4.375
	311-517-143B	8:33	4.125

Partly synchromeshed transmission:

Gear	Part No.	No. of teeth	Ratio
1st	113-309-251A	10:36	3.60
2nd	113-309-261	17:33	1.94
	113-309-261	17:32	1.88
3rd	113-309-375	22:29	1.22
	113-309-275A	22:27	1.23
4th	113-309-341A	28:23	0.82
Ring & Pinion	113-517-141B	7:31	4.43

Part Numbers - There are different part numbers for various gears in addition to the ones listed here. This in general indicates changes on the parts such as:

Gear	Part No.	Ratio	Difference

4th	113 311 341	0.82	With Keyway
	113 311 341A	0.82	With Splines
Ring &	311 517 143	4.13	6 mtg bolts
Pinion	311 517 143	4.124	8 mtg bolts

d) However, there are no standard ratios other than the ones listed here. A gear removed from a transmission can be identified by the number of teeth.
e) Alteration of the shock absorber mounts is permitted.
f) The transmission shall not be installed in an inverted position.
g) The differential cannot be modified in any way to limit its normal function. Torque biasing, limited slip, and locked differentials are prohibited.

6 - Frame/Chassis

a) The frame/chassis shall be constructed of steel tubing of a maximum diameter or width of 10.2cm (4in) and be of a safe and suitable design. The Driver's feet shall not extend beyond the rear of the front axle beam tubes.
b) There may be no frame/chassis rigidity or strength derived by means other than the frame/chassis tubes. Stressed skin, monocoque, or semi-monocoque construction is not permitted, except that:
    i. The firewall panel may be rigidly attached to the frame tubes.
    ii. The bottom of any bodywork that extends beyond the frame members shall be on the same flat plane as the undertray and shall not deviate from that flat plane by more than 1in. Effective for any newly registered Cars after 1/1/83.
    iii. Engine bay undertray(s) shall be no wider than the frame rails in this area or no more than 1/4 inch wider (on each side) than the frame rail when the undertray has an upward turned edge that facilitates mounting the undertray to the chassis or that facilitates mounting the body to the chassis. The undertray(s) between the axle center lines shall be rigidly attached to the frame provided the curvature of said tray(s), measured vertically from the lowest point to the highest point at their attachment to the frame rail members at the sides, shall not exceed 1in and have no downward turned edges.
    iv. Transmission undertrays for Cars with a rear subframe shall be no wider than the subframe, or no more than 1/4 inch wider (on each side) than the subframe when the undertray has an upward turned edge that facilitates mounting the undertray to the subframe or that facilitates mounting the body to the subframe, or 16in whichever is wider. For Cars without a subframe, the tray shall be no wider than 16in and both shall be firmly attached.
    v. The area between the upper and lower main frame tubes, or for 14in above the floor pan, whichever is greater, and between the front and rear roll hoop bulkheads shall be protected by one of the following methods to prevent the intrusion of objects into the cockpit.
        1. Panel(s) of a minimum of either 0.060in heat treated aluminum (6061 T6 or equivalent) or 18 gauge steel shall be attached outside the main frame tubes.
        2. A reinforced body of a double layer, 5oz bi-directional, laminated Kevlar material incorporated into the body shall be securely fastened to the frame tubes.
        3. For either method, fasteners shall be no closer than an average of 6in centers (no stress bearing panels). The material used for the chassis braces in this area shall be at least equivalent to the roll hoop brace material.

7 - Body

a) The rear bodywork shall enclose the engine by surrounding it from a point no higher than the lower edge of the intake manifold and extending from the front of the engine to its rear on each side. The top of the rear bodywork shall extend from the back of the firewall to a point at least 41 cm (16in) to the rear of the center line of the rear axle.
b) The rear locating arms, coil springs, and shock absorbers may not be faired in and must be visible and accessible from the side without removal or manipulation of any panel or part. Where a mono-shock rear suspension has been fitted, the bodywork may cover the spring shock assembly. Specifically, the front mounting point of the radius pad may be inside the trailing edge of the side body panel so long as the panel does not extend back over the trailing arm itself.
c) The competitor's seat must be capable of being entered and left without the removal or manipulation of any panel or part. Removable side bolsters are permitted, as long as they are secured during racing and can be removed by the driver to facilitate emergency egress from the vehicle. Firewall, floor, and safety equipment must conform to the F1600 requirements.
d) A firewall to prevent passage of flame and debris between the engine area and Driver's compartment shall extend the full width of the cockpit and be at least equal to the top of the carburetor in vertical height.
e) The front suspension uprights (shock absorber mounts), shock absorbers, and/or trailing arms may not be faired in by covering or shrouding away from the airstream.
f) No part of the frame or body shall project beyond a plane connecting the vertical center lines of the front and rear tires.
g) Any bodywork forward of the center of the torsion bar tubes shall have a maximum width of 81 cm (31.75").
h) Forward facing air ducts may be installed for the purpose of delivering cooling air directly to the engine, cylinder heads, oil cooler, and/or carburetor, provided the ducted air makes a 90 degree bend within the bodywork. Air duct openings may be located within the cockpit area, and/or penetrate the firewall, provided the duct is baffled or the firewall is extended to prevent flame and debris from reaching the Driver. Any shape may be used to form firewall extension. Any other firewall inlet shall also prohibit passage of flame and debris. (Recommend: that ALL of this extension be the same width as the firewall, allowing for bodywork contour limitations, and extend in a horizontal plane back 2in, minimum, past the carburetor body.)
i) Wings (air foils) are prohibited.
j) Fuel filler caps, necks, or lids, may not protrude beyond the bodywork of the vehicle.
k) The competitor must be able to see 90 degrees to either side with both eyes by turning the head, but without lifting the head forward or otherwise moving from the normal driving position. Lexan or similar transparent uncoloured material may be substituted for existing bodywork. Token portholes do not satisfy this requirement.
l) Only a structural member such as a frame tube or roll bar braces may interrupt the required field of vision.

8 - Non-Standard Replacement Parts

a) The use of the following non-standard replacement parts is permitted provided that no unauthorized modification of any other component results.
    i. Fasteners (nuts, bolts, screws, etc.)
    ii. Wiring
    iii. Gaskets and seals
    iv. Brake lines and fuel line
    v. Spark plugs (maximum 1/2in reach)
    vi. Piston rings
    vii. Wheel bearings
    viii. Connecting rod bearings and crankshaft main bearings of same type and size as standard VW
    ix. Brake shoes and brake lining

x. Valve guides
xi. Ignition points or drop-in ignition triggering module

9 - Electrical

a) The use of any single 6 or 12 volt battery is permitted to power the starter and engine ignition system.
b) Any secondary batteries connected only to gauges, and communications or data acquisition equipment are allowed.
c) The electrical system may be 6 or 12 volt except the starter motor which shall remain as the 6 volt unit.

10 - Ballasting

a) Ballasting is permitted as long as it is securely attached to the vehicle in a safe manner that does not interfere with the safe operation of the vehicle or impede access for the driver.

SECTION 11 - SPORTS RACING REGULATIONS

Sports racing vehicles are defined as purpose-built (not production based) racing vehicles with bodywork which extends the full width of the vehicle including the wheels and tires.

1 - Coachwork And Chassis

a) The vehicle must be equipped with a roll-over bar which extends at least 5 cm (2") above the competitor's helmet when the competitor is in a normal seating position.
b) The maximum overall vehicle width including wheels and tires is 221 cm (87"); the maximum overall vehicle length is 533 cm (210").
c) Bodywork must cover all suspension components when viewed from above. The competitor's position must have an opening for competitor entry/egress at least as large as required in the current F1600 rules.
d) Any wings or aerodynamic devices may be used provided they do not exceed the overall width of the vehicle, and that the total length of the vehicle including these devices does not exceed 533.4 cm (210").

2 - Suspension, Wheels And Tires

a) Suspension is unrestricted.
b) Wheels must be a minimum of 25 cm (10") in diameter on both axles. Width is unrestricted provided the wheel/tire combination used does not protrude beyond the sides of the vehicle.
c) Tires must be of a type specifically made for racing, or DOT approved radials with a minimum speed rating of 'H'.

3 - Engine And Drivetrain

a) Engine and drivetrain type, mounting location, and orientation is unrestricted.
b) Front engine/rear drive vehicles must be fitted with driveshaft safety hoops as specified in the GT rules.
c) Clutch scattershields are required if the clutch or flywheel plane of rotation intersects any portion of the competitor's position.
d) Rotary and forced-induction engines will have their displacement factored as described in the GT rules. Sports Racing cars may not exceed 2.5 litres in effective engine displacement as described in the GT rules

4 - Brakes

a) Sports racing vehicles must be fitted with four-wheel hydraulic brakes. A dual-action system must be fitted such that in the event of a leak or failure of one circuit, full braking is maintained on at least two wheels.

5 - Miscellaneous

a) The electrical system must be equipped with an externally accessible and clearly marked kill switch, as described in the GT rules.
b) The competitor's position must be equipped with a racing seat offering head support and a minimum five-point restraint system. The restraint system must be FIA or SFI approved and be in like-new condition. Appendix 4 contains more specifications on the driver restraint system.
c) Sports racing vehicles must be equipped with a fuel cell.

SECTION 12 - ICE RACING

Ice racing vehicles are defined as being designed or used for wheel-to-wheel competition on ice or hard packed snow surfaces.

Ice racing vehicles are required to meet minimum safety standards as outlined in the current WCMA Race Competition Regulations, Appendix 1, Appendix 3, Appendix 4, and Appendix 5. Note that the FIA 8858 head and neck restraint system is highly recommended but not mandatory for ice racing.

Drivers must have a current WCMA basic competition license and have attended an ice race driving school as a minimum.

The individual organizing clubs may provide event supplementary regulations, classification definitions and tire restrictions. These may not contravene the GCR's.

APPENDIX 1 - ROLL CAGE SPECIFICATIONS

All vehicles, regardless of date of manufacture, must be fitted with a roll cage. These specifications apply to all vehicles registered (issued a WCMA logbook) after June 1, 2013. Cars registered before this time may continue to compete with their previous roll cage, however it is recommended to upgrade to the following specifications.

FIA approved roll cages with dash bar are permitted. Refer to the FIA International Sporting Code, article 253-8, available at http://www.fia.com/sport/Regulations/sportcoderegs.html (Appendix J).

All vehicles, regardless of date of manufacture, must be fitted with a FIA approved roll cage, SCCA roll cage (with dash bar), or a roll cage conforming to the following specifications:

a) The top of the roll bar shall be at least 5.08 cm (2") above the top of the competitors helmet or as close to the roof as possible. The top of the roll bar shall be no more than 25.4 cm (10") behind the competitor's helmet when the competitor is in the normal driving position.
b) It is highly recommended that any part of the roll cage structure which may be struck by the competitor's helmet in a serious impact be covered with a flame-retardant energy absorbing material.

1 - Construction Materials

a) The main hoops and primary bracing should be constructed from round, mild steel, DOM type tubing. Chrome molly tubing such as 4130, may be used but is not recommended. ERW tubing is not allowed.
b) Aluminum and composite materials are prohibited construction materials for roll cage structures.
c) All cages must have a 0.476 cm (3/16") diameter inspection hole drilled in a non-critical area of each main hoop, fore and/or aft supports (as applicable), and front hoop (as applicable).
d) Minimum tube size and wall thickness are as follows for vehicle weights including competitor:

Vehicle Weight	***Tubing size (outer diameter x wall thickness)***
Up to 1700 lbs	**1.375” x 0.080”**
1701 lbs – 2699 lbs	**1.500” x 0.095”** **1.625” x 0.080”**
2700 lbs and up	**1.500” x 0.120”** **1.750” x 0.095”** **2.000” x 0.080”**

2 - Fabrication

2.1. Bends

One continuous piece of tubing must be used for the main hoop with smooth continuous bends and no evidence of crimping or wall failure. The radius of bends in roll cages (measured at centerline of the tubing) shall not be less than three (3) times the diameter of the tubing, A similar piece shall be used for the other main hoop or hoops. A figure of each hoop configuration is provided to illustrate the acceptable basic configurations:

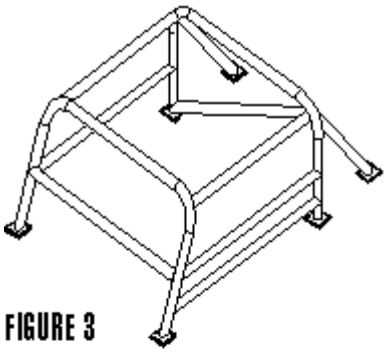


FIGURE 3
MAIN HOOP / PARALLEL FRONT HOOP

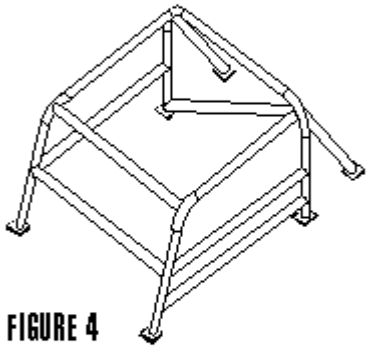


FIGURE 4
MAIN HOOP / TWO SIDE HOOPS

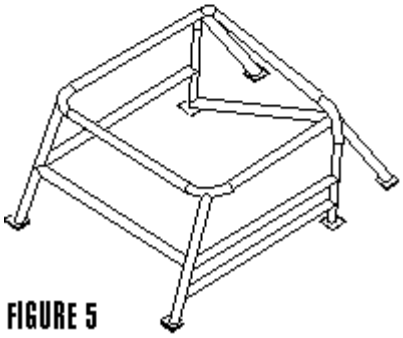


FIGURE 5
MAIN HOOP / TOP HOOP

2.2. Main Hoops

All **hoops** should start as close as possible to the floor of the vehicle and come as close as possible to the sides of the vehicle for maximum competitor protection.

Ovality: Maximum allowable ovality is 8% of the nominal pipe diameter. Ovality is measured as the variation between the maximum and the minimum dimension of the pipe in one location per figure 1.

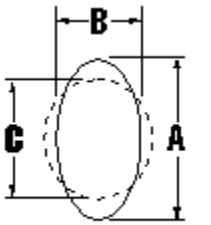


FIGURE 1 – OVALITY

Formula for ovality:
(A – B) / C = 0.08 maximum

Notes:
A = maximum measurement
B = minimum measurement
C = nominal diameter

In the case of tube frame vehicles, the roll cage structure must be attached to the chassis with suitable webbing or gusseting to distribute loads over as wide an area as possible.

In the case of unit body vehicles, it is recommended procedure to attach the four ends of the main hoop tubes into L shaped plates at the junction of the floor and rocker panels rather than just to a plate on the floor. Additionally, it is highly recommended that all cages be tabbed into the basic body structure at least every 60.96 cm (24") or wherever possible.

2.3. Bracing

a) In the case of the twin lateral hoop design, the front and rear hoops shall be joined by a piece of equal dimensioned tubing on each side.
b) Rear stays must attach to the rear hoop no lower than 20.32 cm (8") from the top of the hoop and at an angle no steeper than 35 degrees from vertical. These rear stays must be made from a straight piece of tubing and be attached to a suitably stiff or reinforced area. A diagonal brace must be fitted from near the top of the hoop to a position near the opposite corner of the hoop. This brace must be as straight as possible.
c) Side protection bars must be attached between the front and rear hoops on both sides of the vehicle. These bars should be attached to the front hoop no higher than 30.48 cm (12") off the floor and on the rear hoop and no higher than 60.96 cm (24") off the floor. The competitor's side must be fitted with at least two side protection bars which follow as closely as possible the outline of the door. NASCAR style multiple anti-intrusion bars are highly recommended.
d) A bar joining the two outer members of the front hoop near steering column level is required.

3 - Mounting Plates

a) The four lower hoop tubes must be connected to plates welded or bolted to the frame or floor of the vehicle.
b) On unit body vehicles, all plates shall be at least 129 square cm (20 square") in area. The minimum thickness of these plates shall be 0.20 cm (.080") in the case of weld on plates and . 1875 for bolt on types. Bolt on types shall have a minimum of three 0.952 cm (.375") grade 5 bolts fastening each plate and must have a backup plate of equal size and thickness on the other side of the floor with the bolts passing through both plates and the floor.
c) Vehicles with frame type construction must use plates of at least 51.6 square cm (8 square") area and 0.1875 thickness regardless of whether they are bolted or welded.

4 - Welding

a) It is essential that all welding be of the highest possible quality. Slag welds, poor arc and gas welds are NOT acceptable. It is highly recommended that only certified people carry out arc welding on roll cages. TIG or MIG are the preferred welding processes. Cages with unacceptable welding will not be passed.

5 - Gusseting

a) It is important that loads be distributed over as wide an area as possible especially in the case of cages on space frame type vehicles. Gussets or tie-in tubes must be used at main tube junctions of the roll cage members. Gussets should also be used when it is not possible to weld all around a tube because of body interference. Gusset thickness should be at least the same as the tubing wall thickness they are attached to. *Each gusset shall extend in length for a minimum of one pipe diameter in both directions from the center point of the gusset.*

6 - Removable Type Cages

a) Removable roll cages may be fitted to vehicles only if their construction and design allow them to meet the strength requirements of the designs above.
b) Where tubes join, a double shear type mating tab may be used. Where such a tab is used, the tube joining this tab shall have a small piece of tubing welded perpendicular to its length for the bolt to pass through to prevent crushing of the main tube. Tabs shall be at least 3.49 cm (1.375") wide and 0.476 cm (.1875") thick and must be welded to one of the main tubes. When single bolts are used to fasten tubes, they must be of at least 1.11 cm (.4375") diameter and grade 8 material.
c) Sliding tube type junctions may also be used if they meet the following criteria:
d) Wall thickness of the joining tube shall be a minimum of 0.30 cm (.120").
e) Length of this tube shall be a minimum of 7.62 cm (3") on either side of the splice.
f) Attachment shall be made using two bolts on each side of the splice 90 degrees to each other passing straight through the tubing. Grade 5 bolts of at least 9.52 cm (.375") diameter shall be used here. Splicing tubes may be slid either inside the main tubing or over the outside.
g) Alternate joint designs may be approved at the discretion of the scrutineer.
h) Basic design and fabrication of removable type cages must conform to the specifications for non-removable type cages.

7 - Alternate Designs

a) Alternate cage designs may be approved by the scrutineer provided the competitor can produce stress analysis data from a certified professional engineer stating that the roll over structure is capable of withstanding the following loads applied simultaneously to that structure:
   1.5 (x) lateral
   5.5 (x) fore/aft
   7.5 (x) vertical
   (x) is the weight of the car in race trim with the driver aboard and full fuel tank. Calculations shall assume the all up race weight of the vehicle with competitor.
b) The certificate shall be accompanied by a drawing or photograph of the roll cage.

8 - Increasing Roll Cage Height

a) The old main hoop shall be cut off near the chassis mounting and either a new main hoop of equal tube size or a section of equal sized tubing may be added
b) Inner tubing shall be used to mate all sections together.
c) All braces should be a minimum distance of 6 inches from the top of the hoop.
d) The inner tubes shall be rosette welded at three points near the top and three points near the bottom.

9 - Old roll cage specs (archived)

a) The main hoops and primary bracing should be constructed from round, mild steel, ERW or DOM type tubing. Chrome molly tubing such as 4130, may be used but is not recommended.
b) Aluminum and composite materials are prohibited construction materials for roll cage structures.
c) All cages must have a 0.476 cm (0.1875") diameter inspection hole drilled in a non-critical area of each main hoop, fore and/or aft supports (as applicable), and front hoop (as applicable).
d) Minimum tube size and wall thickness are as follows for vehicle weights including competitor:

Under 1500 lbs	3.49 cm X 0.24 cm (1.375" X .095")		
Under 2500 lbs	3.81 cm X 0.24 cm (1.500" X .095")	or	3.49 cm X 0.30 cm (1.375" X .120")
Over 2500 lbs	3.81 cm X 0.30 cm (1.500" X .120")	or	4.44 cm X 0.24 cm (1.750" X .095")

APPENDIX 2 - COMPETITOR SAFETY EQUIPMENT

These standards constitute the minimum acceptable standard of safety precaution. Individual class preparation rules may increase applicable safety requirements.

1 - General

Drivers must wear the following equipment during all on-track sessions:

a) Helmet,
b) fire-resistant (e.g. Nomex) balaclava
c) One-piece fire-resistant suit
d) Gloves

Cars shall be equipped with and the drivers shall utilize seat belts and shoulder harness meeting the specifications of these regulations.

In addition, open cockpit and open wheel vehicles require the use of arm restraints.

2 - Helmets

a) Only helmets **in FIA technical list 25** will be accepted:
    1. Snell Foundation – Snell SA2000[17], SA2005[18] , SA2010 or SAH2010 www.smf.org
    2. FIA Standard 8860-**2004, 8860-2010**
    3. **SFI 31.1, SFI 31.1A, SFI 31.2 see note**[19]
b) Once the new standard of helmet is available every effort should be made to have that helmet
c) No helmet may be modified from its specification as manufactured, except in compliance with instructions approved by the manufacturer. Any other modification will render the helmet unacceptable. The fitting of earplugs and microphones may be done only in respect of the paragraph above.
d) The back of each helmet must be labeled indicating name, date of birth and allergies and other pertinent medical history such as tetanus immunization, diabetes, etc.
e) Helmets must be in good condition. Helmets which have deep scratches, gouges, or cracks will not be permitted for use in on-track sessions. It is highly recommended that helmets be kept out of direct sunlight to prevent UV radiation damage.
f) The inside liner of the helmet must be in good condition. The fireproof lining should be free from contaminants, and the foam should not show any degradation.
g) The chin strap must be functional and not slip when tugged upon.
h) Full face helmets and shields must be worn by drivers of open cockpit cars and are strongly recommended for drivers of closed cars.

[17]SA2000 helmets **are not valid after Dec 31, 2014. Helmets** are accepted provided they are in good condition. If you plan on traveling to other regions, please check with that region's regulations to determine which helmets are acceptable.
[18]**SA2005 helmets are not valid after Dec 31, 2018.**
[19]**SFI 31.1, SFI 31.1A and SFI 31.2A helmets are not valid after Dec 31, 2018**

Specimens of helmet labels

3 - Driver Restraint System

a) All race cars in WCMA events must utilize either a five (5), six (6) **or seven (7)** point restraint harness meeting FIA/ISO standard No. 8853 or SFI 16.1 at all times during practice, qualifying and the race. The restraint system installation is subject to approval of the scrutineer.
b) Note that a FIA 8858 approved **Frontal Head Restraint** is mandatory for road course racing. The driver restraint system includes not only the head and neck restraint device itself, but the seat belts, helmet, seat and seat mounting. **A guide on the use of frontal head restraint systems can be found here. Always consult the manufacturer for proper use of any safety equipment.**
c) For vintage classes and in ice races, the use of a FIA 8858 approved Frontal Head Restraint is not mandatory but is highly recommended.
d) A five (5) point system (at minimum) is required for use in cars where the driver is seated in an upright position and consists of a lap belt, two (2) shoulder straps and an anti-submarine strap.
e) A six (6) point system (at minimum) is required for use in cars where the driver is seated in a semi-reclining position and consists of a lap belt, two (2) shoulder straps and two (2) anti-submarine straps.
f) It is recommended to have load spreading padding at pressure points. The lap belt and shoulder straps shall be of 76mm (3") minimum width and the anti-submarine strap(s) of 44mm (1.73") minimum width. HANS-specific two-inch/three-inch hybrid shoulder straps are permitted, but only when used in conjunction with a HANS-style device.
g) The material of all straps shall be **in good** condition. The buckles must be of metal-to-metal quick release type except in the case of leg straps of the six point system where they attach to the seat belt or shoulder harness straps.
h) Only separate shoulder straps are permitted. "H" type configuration is allowed. "V" and "Y" type shoulder straps are not allowed.
i) All straps must be free to run through intermediate loops or clamps/buckles.
j) The minimum acceptable bolts used in the mounting of all belts and harnesses are 3/8in SAE Grade 5. Where possible, seat belts, shoulder harness and anti-submarine straps should be

mounted to the roll structure or frame of the car. If clip-in eye bolts are used, the clip must be secured with a cotter pin or lock wire to prevent accidental release.

k) Where it is not possible to mount belts and straps directly to the roll structure or frame of the car and they must be attached to a structural panel for example, the panel must be suitably reinforced in a workmanlike manner to prevent distortion under load. Steel reinforcing plates of adequate large area and thickness must be installed to prevent the belt attachment from pulling through the panel under load.
l) Bolting directly to the floor panels, etc. without adequate reinforcement in not acceptable.
m) SFI 16.1 Driver restraint systems shall be replaced or re-certified every two (2) years. SFI 16.1 Restraint systems must show a date stamp less than two (2) years old.
n) FIA/ISO 8853 Driver Restraint systems shall be replaced every five (5) years from the date of manufacture or the expiry date as indicated by the manufacturer's label.
o) A one-piece racing seat must be fitted in place of the standard driver's seat. The passenger seat may be removed or replaced with a racing seat. All seats must provide a headrest; alternately, a padded head rest may be affixed to the roll cage. The head restraint must have a minimum area of 235 square cm (36 square") and be capable of absorbing two hundred (200) pounds force in a horizontal direction. The headrest must be within five (5) centimetres (2 inches) of the driver's helmet in a normal seated position. If a competitor is replacing an existing seat with a new seat it is recommended to install a racing seat that carries a SFI, FIA 8855 1999 or FIA 8862 2009 approved label.
p) Improved Touring and Ice Racing classes may use original equipment seats, provided that an adequate headrest (as defined above) is fitted to the rollover structure. A shoulder harness anchor or guide must be provided immediately behind the seat back at shoulder level.
q) Drivers of open cockpit cars must use SFI or FIA approved arm restraints. **This includes open Targa tops, sunroofs and t-tops.**

4 - Onboard Fire Suppression Systems

a) Onboard fire suppression systems, if used, must be securely mounted using metal hold downs. Portable fire extinguishers incorporating plastic components are prohibited. Any fire suppression system, if used, must have a minimum rating of 10 BC.
b) The activation lever or knob must be positioned such that accidental triggering by snagging on clothing or due to unintentional driver movement is not possible. If a fixed onboard system is fitted, the actuator must be clearly identified and be accessible from both outside the vehicle and by the driver while seated in driving position.

5 - Driver Suits and Underwear Systems

The following one piece, driver suit/underwear systems are approved.

a) Suits of two layers of approved material worn with approved underwear.
b) Suits of three layers of approved material.
c) Suits carrying an SFI3-2A/3 rating worn with approved underwear.
d) Suits carrying an SFI3-2A/5 or higher rating.
e) Multilayer suits carrying an FIA Homologation.
f) Suits, which the manufacturer states in writing meet or exceed the standards stated herein, may be substituted for that standard.
g) It is highly recommended that underwear of approved material be worn under all driver suits.
h) While competing, drivers should not wear any clothing composed in whole or in part of Nylon.
i) In the case of doubt concerning the composition of a suit/underwear system, the driver shall be able to present adequate evidence that it conforms to one of the above standards.

j) Socks made of fire-resistant material are mandatory. Shoes or gloves made of leather or any approved fire-resistant material containing no holes are mandatory. Shoes may have synthetic rubber soles. Gloves and shoes must have a layer of fire-resistant material next to the skin.

APPENDIX 3 - RACING NUMBERS AND CLASS DESIGNATION

a) Racing numbers are applied only as follows:
   - The numbers must be at least ten (10) inches high on production based cars and eight (8) inches high on open wheel cars. The minimum width of stroke of all numbers is two (2) inches.
   - The numbers must be in a solid colour, on a solid background of a significantly contrasting colour. Black on white is preferred and recommended.
   - One (1) number must be on the front hood of production based cars and on the nose of open wheel cars.
   - One (1) number must be on each side of the car positioned on the body above an imaginary line running through the center line of the wheels. Open wheel cars may vary this location, however, side numbers shall in no way be partially or completely obscured by the vehicle's wheels.

b) On production based cars, a racing number, one half the size of the normal number, must be placed on the rear of the car on a vertical surface and must be clearly visible and legible.

c) Metallic or other highly reflective numbers are not permitted.

d) Cars not meeting the specification of this regulation, in the opinion of the steward, during any scheduled track session will be black flagged and not allowed to re-enter the track until the numbers are in compliance.

e) Class designations are applied as follows:
   - The class designation shall be at least one half the size of the numbers.
   - The class designation shall be placed close by the numbers on the sides of the car.

f) Except for classes in which there are only one required minimum weight, the minimum weight of the classified car (in pounds) shall be displayed beneath the class designation on the driver’s door. This includes IT and ST classes. Minimum font height is 1 inch.

APPENDIX 4 - VEHICLE SAFETY REQUIREMENTS

All racing vehicles must use a dual-circuit hydraulic braking system.

1 - Engine Catch Tanks

a) In order to prevent fluid spillage, all fluid reservoir and sump vent tubes must be routed to a suitable container of one (1) litre minimum capacity for vehicles with engine displacement of under two litres. Vehicles with an engine displacement of over two litres require a suitable container of a minimum of 2 litres capacity. Any catch tanks shall be translucent or be fitted with sight tubes to facilitate easy checking of their contents.
b) The cooling system must be a closed system or its overflow lines must run to a two (2) quart minimum capacity catch tank separate from the oil catch tank.

2 - Electrical

a) A master switch/safety kill switch must be fitted. It must directly disable all of the electrical systems on the vehicle (except for fire supression systems), i.e. solenoids may not be used. If the kill switch does not disable the main starter cable, the starter cable must be fitted with a fusible link. This fusible link must not be installed near the engine compartment or fuel cell. The safety kill switch must be mounted on the cowl at the base of the windshield on the driver's side. Its location must be marked clearly (using a red spark on a blue triangle with a white border), and its operation must be obvious. If the driver cannot reach this switch while in the normal driver's position, a second switch with identical function must be fitted in the driver/passenger compartment such that the driver can operate the switch while strapped into the safety harness.
b) All terminals of the safety kill switch must be insulated to prevent shorting out.
c) The location of the safety kill switch must be:
    - on Formula and Sports Racing Cars – in proximity to the right hand member of the roll bar, but in a location so that it cannot be operated accidentally. It can be mounted on a bracket welded to the inside of the upright member or mounted so that the operating lever or knob is outside of the body panel immediately in-board of the upright member. This is the standard location on Formula cars built to the Constructor’s Association requirements for Formula 1.
    - on Closed Sports Racing cars, production based cars, Improved Touring, CC, ST and GT cars: In front of the windshield on either the cowl or on top of the fender, but close enough to the windshield to be accessible if the car is overturned. Alternatively, it may be mounted below the center of the rear window or on a bracket welded, clamped or bolted to the roll cage or dash, easily accessible through the open window. (Drilling of holes in roll cage to attach the bracket is prohibited.)
d) Any electric starter may be used. The main starter cable terminal must be securely insulated.
e) An external boosting system to assist the vehicle's electrical system may be installed, provided that it cannot be accidentally shorted.
f) Alternators may be removed or substituted.
g) Vintage exhibition vehicles are exempt from these regulations.
h) Formula vehicles may mount the kill switch on or adjacent to the bulkhead behind the driver.
i) All vehicles must have a rain/tail light that is visible and used when the track surface is wet, thereby causing spray.

3 - Mirrors

a) Mirrors shall provide driver visibility to the rear of both sides of the car.

4 - Window Glass

a) All windows must be of laminated windshield safety glass, tempered safety glass, or three (3) mm minimum thickness polycarbonate materials, as permitted in the individual class preparation regulations. Acrylic plastic glass is prohibited. Officials may require the replacement of windows/windshields that are considered a safety hazard.
b) Sedans must have the driver's door window fully open or removed during all on-track sessions. A strap-type window net must be fitted such that the driver's arm(s) cannot extend outside the vehicle unintentionally.
c) Where permitted, the passenger door window may remain in place; however, the window (or door/window combination) must be open able from outside the vehicle without the use of tools in order to permit access to the driver/passenger compartment.
d) Windows shall be clear or uncolored, except in Improved Touring or Sport Touring, if no factory or after market clear windows are available.
e) All closed cars shall run with both front door windows fully open.

5 - Window Nets

a) All closed-cockpit cars must have a strap-type window net fitted. The window net must be attached to the structure of the vehicle.
b) Doors with windows installed in the raised position must be able to be opened from the outside.

6 - Inside Net

a) An inside net running between the main roll hoop and the dash is recommended for all production-based cars and two-seater Sports Racing cars (see figure 6). It is recommended that the lower strand of the net pass the shoulder and run horizontally from the cage to the dash. The upper strand should pass the Cg of the helmet in the side view. The net should run parallel to the center of the car in plain view and be as close to the seat as possible. It is recommended that the net be tensioned tightly and have a way to quickly disconnect it in case the driver needs to exit through the car in an emergency. Metal collars, or some other equivalent method, should be used to keep the strands of the net from moving along the roll cage. If possible, the recommended mounting method is to wrap the net strands around the back of the seat and attach them to the main hoop upright. However, teams should consult the net manufacturer to verify their recommended method of mounting.

7 - FUEL, OIL, AND WATER LINES

a) All fuel, oil, and water lines, including gauge and vent lines, that pass into or through the driver/passenger compartment, shall be of steel tube or metal braided hoses or bulkheaded (Cool suit lines are exempt).