

# SCCA Time Trials Nationals Safety Rules

Motorsports are inherently dangerous. These rules are in no way a guarantee against injury or death to participants, spectators or others. You can reduce risk by driving well, by properly using superior safety gear, by paying attention, and by reporting unsatisfactory issues to the event officials.

SCCA Time Trials Nationals safety rules are divided into three minimum levels of requirements, each required depending on the modifications to the vehicle and potential speeds.

Although there are minimum requirements for specific preparation levels, nothing in the rules prevents a driver or entrant from installing more than the minimum safety equipment. In cases where installing safety equipment may necessitate further modification not allowed by a specific competition rule set, the minimum modification necessary is permitted to perform safety equipment installation. E.g. trimming plastic cosmetic trim and carpet for roll bars, or removing door trim, windows and door structure for "NASCAR" style door bars on a roll cage.

## TRACK EVENT Minimum Safety Standards

All vehicles must have functioning road going equipment such as running and brake lights, and adequate tires and brakes. Any vehicle that is classified as a car, and trucks and SUVs that do not present a roll over risk are allowed. Roll over risk is defined as being taller than it is wide.

There is a considerable gap between a minimum standard and the best protection that current technology can provide. It is recommended that seats, restraint systems, roll bars, and helmets meet the highest safety standards possible.

### 1. DRIVER SAFETY EQUIPMENT

#### A. Helmets

Helmets certified as meeting the applicable Snell, FIA, or SFI standards are acceptable. Acceptable standards include: Snell ratings SA2015, SA2010, SAH2010, SA2005, M2015, M2010, M2005, K2010 and K2005, SFI ratings 31.1, 31.1A, 3.12, 31.2A, 31.1 2005, 41.1, 41.1A, 41.2, 41.2A, 41.2 2005 and 24.1, FIA 8860-2010, 8859-2015.

#### B. Clothing

1. All participants shall wear shoes which fully cover the foot at least to the ankle while on course.

Different tracks and municipalities may have different standards than these rules. It is strongly suggested drivers read event “supplementary regulations” for each specific event, paying careful attention to any additional safety standards.

## **2. VEHICLE SAFETY EQUIPMENT**

### **A. Seats and Seat Belts**

All vehicles must provide factory original (or better) seats that are securely mounted and seat belts with a minimum of 3 mounting points mounted in accordance with manufacturers’ recommendations when applicable. (SFI or FIA rated are recommended).

### **B. Convertibles**

It is highly recommended that all convertible vehicles be equipped with an aftermarket roll bar that meets or exceeds the standards set in the SCCA HILL CLIMB Safety Standards. However, TRACK EVENT Safety Standards requires the vehicle meets at least one of the following criteria and is not subject to any of the below exceptions:

- 1.** The vehicle is equipped with an aftermarket roll bar that meets or exceeds the standards set in the SCCA HILL CLIMB Safety Standards.
- 2.** The vehicle is equipped with documented factory installed roll over protection (examples of manufacture documented roll over protection would include hydroformed and reinforced a-pillars or windshield frames and factory installed roll bars and/or “pop-up” bars that are designated as roll over protection.
- 3.** The Vehicle is a 2006-year model or newer.

### **C. Convertible Exceptions:**

In addition, vehicles that were manufactured since 2006 that fall into any of the below categories must meet the criteria stated above for factory or aftermarket roll over protection:

- 1.** Vehicles equipped with factory V8 or forced induction engine
- 2.** Vehicles modified meaningfully beyond the factory performance potential (examples: engine swaps, aftermarket forced induction)

Note: Targa and T-Top vehicles are classified as "hard tops" and do not have to meet the terms and conditions of the convertible policy.

**3. VEHICLE PREPARATION AND INSPECTION:** The entrant is responsible for insuring that the vehicle being used is properly prepared for operation under elevated acceleration, braking and cornering forces. Have a Tech inspection sheet completed, if required, and available to present to the SCCA tech inspector.

## HILL CLIMB Minimum Safety Standards

**1. MINIMUM VEHICLE SAFETY EQUIPMENT:** All vehicles must have the following safety equipment at a minimum: driver restraints, roll bar or cage, fire extinguisher. Vehicles shall meet the safety requirements for the class in which they are logbooked.

**2. ROLL BAR SPECIFICATIONS:** A roll bar is defined as a main hoop and diagonal placed behind the driver and supplemented by two braces. The roll bar must be designed to withstand compression forces resulting from the weight of the car coming down on the roll structure, and to take fore-and-aft loads resulting from the car skidding along the ground on the roll structure. The basic purpose of the roll bar is to protect the driver in case the vehicle rolls over.

**A.** One continuous length of tubing must be used for the hoop member with smooth continuous bends and no evidence of crimping or wall failure.

**B.** The top of the roll bar must be above the top of the driver's helmet when the driver is in normal driving position.

**C.** The two (2) vertical members forming the sides of the hoop must be more than fifteen (15) inches apart (inside dimension), and it is desirable that it extend the full width of the cockpit.

**D.** An inspection hole of at least 3/16 inch diameter to facilitate verification of wall thickness might be required. It must be drilled in a non-critical area of a roll bar member at least three inches from any weld or bend.

**E.** All bolts and nuts shall be SAE Grade 5 or better, 5/16" minimum diameter.

**F.** Braces and portions of the main hoop subject to contact by the driver's or passenger's helmet, as seated normally and restrained by seatbelt and harness, must be padded with a non-resilient material such as Ethafoam (R) or Ensolite (R) or other similar material with a minimum thickness of one-half inch. Padding meeting SFI spec 45.1 or FIA 8857-2001 is strongly recommended.

**G.** The size of tubing to be used for the main hoop, braces and diagonals shall be determined on the basis of the weight of the car. The following minimum sizes are required and are based upon the weight of the car without the driver. Dimensions are nominal. 0.005" variation in wall thickness is allowed.

Vehicle Weight Tubing Size (inches)	(outer diameter x wall thickness)
Up to 999 lbs	1.00 x .060
1,000 - 1,500 lbs.	1.25 x .090
More than 1,500 lbs.	1.50 x .120 1.75 x .095

**H.** The roll bar hoop and all braces must be of seamless or DOM mild steel tubing (SAE 1010, 1020, 1025) or equivalent, or alloy steel tubing (SAE 4130). For cars logbooked before 1/1/16, existing ERW tubing is acceptable.

**I.** All welding should be of the highest possible quality with full penetration. Craters should be filled to the cross section of the weld and undercut be no more than 0.01 inch deep.

**J.** All roll bars must be braced in a manner to prevent movement in a fore-and-aft direction with the braces attached within the top one-third of the roll hoop. At a minimum, two braces must be used, parallel to the sides of the car, and placed at the outer extremities of the roll bar hoop. Such braces should extend to the rear whenever possible. Diagonal lateral bracing must be installed to prevent lateral distortion of the hoop. In most cases, a lateral brace from the bottom corner of the hoop on the side to the top corner of the hoop on the other side is sufficient. Although installing the diagonal lateral brace in the main hoop is the strongest (and hence most preferable) alternative, there may be instances where such an installation is not practical. In such situations, the installation of the diagonal brace running from the bottom of the fore/aft brace on one side to the top corner of the hoop on the other side is acceptable. In convertible vehicles with a production line beginning 1990 or later, such as the Mazda Miata, a "V" design, also known as a "double diagonal" used between the rear supports is acceptable.

**K.** Removable roll bars and braces must be very carefully designed and constructed to be at least as strong as a permanent installation. If one (1) tube fits inside another tube to facilitate removal, the removable portion must fit tightly and must bottom on the permanent mounting, and at least two (2) bolts must be used to secure each telescope section. The telescope section must be at least eight (8) inches in length. One bolt is required if one end is welded to the main hoop.

**L.** It is recommended that all cars utilize a roll cage as defined in the current GCR.

**M.** Roll bars and braces must be attached to the frame of the car wherever possible. Mounting plates may be used for this purpose where desired.

**N.** In the case of cars with unitized or frameless construction, mounting plates may be used to secure the roll bar structure to the car floor. The important consideration is that the load be distributed over as large an area as possible. A backup plate of equal size and thickness must be used on the opposite side of the panel with the plates through-bolted together.

**O.** Mounting plates bolted to the structure shall not be less than 0.1875 (3/16) inch thick and the use of a back-up plate of equal size and thickness on the opposite side of the panel with the plates through-bolted together is recommended. A minimum of 3 bolts per plate is required for bolted mounting plates.

**P.** Mounting plates welded to the structure shall not be less than .080 inch thick. Whenever possible the mounting plate should extend onto a vertical section of the structure such as a door pillar.

**3. FIRE SYSTEMS:** All vehicles shall meet one of the following minimum requirements:

A. On-board fire systems per GCR

B. Halon 1301 or 1211, two (2) pound minimum capacity by weight.

C. Dry chemical, two (2) pound minimum with a positive indicator showing charge. Chemical: 10 BC or 1A10BC Underwriters Laboratory rating.

D. The fire extinguisher shall be securely mounted. All mounting brackets shall be metal and of the quick-release type.

**4. DRIVER RESTRAINTS:** All drivers shall utilize either a five, six or seven point restraint harness meeting one of the following: SFI specification 16.1 or 16.5, FIA specification 8853/1985 including amendment 1/92 or FIA specifications 8853/98 and 8854/98. All harnesses shall bear labels bearing either SFI or FIA certification. Shoulder straps shall be separate. Two inch shoulder straps shall only be used with head and neck devices. SFI and FIA harnesses are not subject to a time constraint but shall be in good condition (no cuts, abrasions, abnormal wear, etc.).

**5. SEATS:** It is highly recommended that the driver's seat be replaced with a one-piece bucket type race seat. If used, the one-piece bucket type race seat shall be securely mounted, so as to provide fore/aft and lateral support.

**6. VEHICLE PREPARATION AND INSPECTION:** The entrant is responsible for insuring that the vehicle being used is properly prepared for operation under elevated acceleration, braking and cornering forces. Cars must have a SCCA Time Trials or Road Race Logbook or a logbook from an accepted racing organization. Annual Inspections are allowed. Car numbers shall be at least 8 inches high and class letters shall be at least 4 inches high. Vehicles and/or logbooks will be inspected by the SCCA tech inspector at each event.

# RACE Minimum Safety Standards

## 1. DRIVER'S SAFETY EQUIPMENT

All required driver's safety equipment must be worn at all times while on track. The participant agrees that the participant bears the ultimate responsibility at all times to ensure the safety of participant's driver's safety equipment, and compliance with all SCCA rules, regulations, and agreements, including but not limited to those contained in the TT Rules.

### A. Inspection

All driver's safety equipment will be inspected by an event official. The official performing the inspection shall affix a dated, non-removable sticker or decal on the left side of helmets that to indicate that all driver's safety equipment has been inspected and is in compliance with this section. This sticker or decal, which shall be placed on the helmet in a manner such that it is visible from outside the car with the driver seated and belted in the normal driving position, may be checked by grid or scrutineering personnel on the starting grid. The presence of other externally visible driver's safety equipment (gloves, balaclava, and suit) may also be checked by grid or scrutineering personnel on the starting grid.

### B. Annual Inspection

SCCA General Competition Rules compliant annual inspections may be accepted by event organizers.

### C. Required Equipment

The following required equipment shall be in good condition and free of defects, holes, cracks, frays, etc.

1. Driving suits that effectively cover the body from the neck to the ankles and wrists. One-piece suits are highly recommended. All suits shall bear an SFI 3.2A/1 or higher certification label or FIA 1986 Standard or FIA Standard 8856-2000 homologation label. Underwear of fire resistant material shall be used but is optional with suits carrying an FIA Standard 1986 Standard or FIA Standard 8856-2000 label or SFI 3-2A/5 or higher (e.g., /10, /15, /20) certification label.
2. Crash helmets approved by the Snell Foundation with Snell sticker 2010 or later Special Application SA2010/SAH2010, or SA2015/SAH2015, or by the SFI with a SFI Sticker SFI 31.1, or by the FIA standard 8860-2004 or later, or British Standards Institute BS6658-85 type A/FR. Each driver's helmet shall be labeled with a minimum of the driver's name.
3. The use of a head and neck restraint system that has been certified in accordance with SFI 38.1 or FIA 8858-2002 or 8858-2010 is required; an SFI 38.1 or FIA 8858-2002 or 8858-2010 label must be properly affixed to the device. Accident damaged helmets should be sent by the driver or his or her representative to the Snell Memorial Foundation, 3628 Madison Ave., North Highland, CA. 95660 (ph.) 916-331-5073 (attn.

Edward B. Becker). Details of the accident should be included. Freon based total loss helmet cooling systems are not allowed.

4. Gloves made of leather and/or accepted fire-resistant material containing no holes.

5. Socks made of accepted fire-resistant material.

6. Face coverings (balaclavas) of accepted fire-resistant material for drivers with beards or mustaches. Hair protruding from beneath a driver's helmet shall be completely covered by fire resistant material. As an alternative to balaclavas, a full helmet skirt of accepted fire-resistant material may be used. Double-layer balaclavas are recommended. If balaclavas are used voluntarily, they shall be of accepted fire-resistant material.

7. Goggles or face shields, preferably made of new impact resistant materials, for drivers of open cars.

8. A driver's restraint system meeting SCCA standards (See section 2 Driver's Restraint System) shall be used at all times while on the track.

9. Shoes, with uppers of leather and/or nonflammable material that at a minimum cover the instep. Ventilation pinholes by the manufacturer are allowed.

## **2. DRIVER'S RESTRAINT SYSTEM**

### **A. Restraint Harness**

All drivers in SCCA sanctioned speed events shall utilize either a 5, 6, or 7-point restraint harness meeting the following specifications. A 7-point restraint harness is recommended. Arm restraints are required on all open cars including open Targa tops, sunroofs and T-tops. Arm restraints shall not be worn in a manner which limits the ability of the driver to provide visible signals to other competitors while on track. The restraint system installation is subject to approval of the Chief Technical Inspector.

1. The shoulder harness shall be the over the shoulder type. There shall be a single release common to the seat belt and shoulder harness. When mounting belts and harnesses it is recommended that they be kept as short as reasonably possible to minimize stretch when loaded in an accident. The shoulder harness shall be mounted behind the driver and supported above a line drawn downward from the shoulder point at an angle of 20 degrees with the horizontal. The seat itself, or anything added only to the seat shall not be considered a suitable guide. Guides must be a part of the roll cage or a part of the car structure. Only separate shoulder straps are permitted. ("Y" type shoulder straps are not allowed.) "H" type configuration is allowed.

2. The single anti-submarine strap of the 5-point system shall be attached to the floor structure and have a metal to metal connection with the single release common to the seat belt and shoulder harness.

**3.** The double leg straps of the 6-point or 7-point system may be attached to the floor as above for the 5-point system or be attached to the seat belt so that the driver sits on them, passing them up between his legs and attaching either to the single release common to the seat belt and shoulder harness or attaching to the shoulder harness straps. It is also permissible for the leg straps to be secured at a point common to the seat belt attachment to the structure, passing under the driver and up between his legs to the seat belt release or shoulder harness straps. All straps shall be free to run through intermediate loops or clamps/buckles.

**4.** Each seat (lap) and shoulder belt of the harness (5, 6, or 7 points) shall have an individual mounting point (i.e. 2 for seat belt and 2 for shoulder belt minimum). 6 or 7-point system anti-submarine straps may share a mounting point with one or both seat (lap) belt(s). The minimum acceptable bolts used in the mounting of all belts and harnesses is SAE Grade 5/Metric 8.8. Mounting hardware, including eye bolts, as provided by the belt manufacturer, may also be used for mounting belts and harnesses. Where possible, seat belt, shoulder harness, and anti-submarine strap(s) should be mounted to the roll structure or frame of the car. Where this is not possible, large diameter mounting washers or equivalent should be used to spread the load. Bolting through aluminum floor panels, etc., is not acceptable. Holes in the roll cage to accommodate the installation of the harness must be bushed and welded completely.

**5.** All driver restraint systems shall meet one of the following: SFI specification 16.1, 16.5, or FIA specification 8853/98, 8853-2016 or 8854/98.

**a.** Restraint systems meeting SFI 16.1 or 16.5 shall bear a dated SFI Spec label and date of expiration which is the last day of the year marked.

**b.** Restraint systems homologated to FIA specification 8853/98 and 8854/98 will have a label containing the type of harness designation ('C-###.T/98 or D-###.T/98) and date of expiration which is the last day of the year marked. All straps in this FIA restraint system will have these labels.

**c.** If a restraint system has more than one type of certification label, the label with the latest expiration may be used.

**6.** Harness Threading: Assemble in accordance with manufacturer's instructions.

### **3. FIRE SYSTEMS**

**A.** At a minimum, hand-held Fire Extinguishers meeting the requirements below must be on board and within the driver compartment.

**1.** Halon 1301, 1211 or Dupont FE-36, two (2) pound minimum capacity by weight.

**2.** Dry chemical, two (2) pound minimum with a positive indicator showing charge. Chemical: 10 BC Underwriters Laboratory rating, potassium bicarbonate (Purple K)

recommended, 1A10BC Underwriters Laboratory rating multipurpose, ammonium phosphate and barium sulfate or Monnex.

**3.** AFFF (aqueous film forming foam) or equivalent surfactant foam material, 2.25 liter minimum capacity (by volume). All AFFF fire bottles shall incorporate a functional pressure gauge.

**4.** The fire extinguisher shall be securely mounted in the cockpit. All mounting brackets shall be metal and of the quick release type.

**5.** The circle "E" decal shall not appear on cars which have only a hand-held fire extinguisher.

**B.** Fire systems are recommended, and if used must meet SCCA General Competition Rules (Section 9.3.22.A)

#### **4. FUEL TANK SPECIFICATIONS**

**A.** Production Chassis vehicles with an OEM fuel tank location between the axles may use the OEM fuel tank.

**B.** Tube-frame Chassis vehicles and production vehicles with an OEM fuel tank location outside of the axles must use a fuel cell and fuel system compliant with SCCA General Competition Rules (Section 9.3.26)

#### **5. 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. 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.

## **6. LIGHTS**

**A.** All production based cars shall have two operating red brake lights and red taillights of at least the equivalent illumination power of a 15-watt bulb. This light shall be mounted as high as possible on the centerline of the car and be clearly visible from the rear. Light assemblies shall be considered one light for the purposes of this rule, irrespective of the number of individual lamps the assembly may contain. Light assemblies may perform both rain and brake light functions provided they have two distinct illumination levels. An optional tail light (“rain light”), as described above, may be added to cars in all other classes.

## **7. SEATS**

**A.** The driver’s seat shall be a one-piece bucket-type seat and shall be securely mounted, so as to provide fore/aft and lateral support.

**B.** Passenger seat back, if a folding seat, shall be securely bolted or strapped in place.

**C.** Mounting structures for racing seats may attach to the floor, cage and or center tunnel.

**D.** Seat mounting points forward of the main hoop, between the center line of the car and the driver’s side door bar and rearward of the front edge of the seat bottom are not considered cage attachment points in classes with limitations on the number of attachments.

**E.** A system of head rest to prevent whiplash and rebound, and also to prevent the driver’s head from striking the underside of the main hoop shall be installed on all vehicles. Racing seats with integral headrests satisfy this requirement. The head rest on non-integral seats shall have a minimum area of 36 square inches and be padded with a minimum of one-inch thick padding. It is strongly recommended that padding meet SFI spec 45.2 or FIA Sports Car Head Rest Material. The head rest shall be capable of withstanding a force of two-hundred (200) lbs. in a rearward direction. The head rest support shall be such that it continues rearward or upward from the top edge in a way that the driver’s helmet cannot hook over the pad.

## **8. WINDOW SAFETY NETS**

**A.** Window safety nets shall be used on the driver’s side window of all closed cars unless these are factory (OEM manufacturer) and FIA GT3/GT4 race prepared cars with fixed Lexan front door windows as noted on a Specification Line.

**B.** All window nets shall meet SFI Specification 27.1. and shall bear an “SFI Spec 27.1. Label” to that effect. Alternatively, window nets that meet the requirements of FIA J253.11 may be used. Competitors must provide proof of meeting the FIA standard, either via certification or physical measurement. (Note: Window nets need not be dated.)

**C.** The window net shall be equipped with a quick release device and when released it shall fall down, thus not having to be flipped up on the roof.

**D.** Nets shall be attached to the roll cage; plastic buckles, cable ties, hose clamps, and elastic cords are not permitted.

**E.** Holes in the roll cage to accommodate either support rod are unacceptable unless bushed and welded completely. (Refer to the SCCA General Competition Rules Section 9.3.53 for additional information on mounting methods.)

**F.** Drivers of open-cockpit cars without the ability to mount a window net and drivers of closed cockpit cars may use arm restraints in lieu of a window net.

## **9. ROLL CAGES**

All RACE SAFETY STANDARD cars must utilize a roll cage compliant with the following specifications. These specifications apply to all vehicles registered (issued an SCCA logbook) after 1/1/08. Cars issued an SCCA Logbook before 1/1/08 may continue to compete with their previous roll cage or comply with the following specifications. Please see SCCA General Competition Rules section 9.4 for diagrams and illustrations.

**A. DEFINITION:** The roll cage consists of the main hoop, front hoop, side protection, and braces as specified in these rules.

### **B. MAIN HOOP**

**1.** The main hoop (behind the driver) must be the full width of the cockpit for all cars. It must be one continuous length of tubing with smooth bends and no evidence of crimping or wall failure. The main hoop must maintain a single plane.

**a.** On all closed cars, the main hoop must be as close as possible to the roof and "B" pillars.

**b.** Open cars without the windshield frame may use an asymmetric main hoop. The main hoop must be full width to the passenger side of the car. On the passenger side of the car the hoop must be at least as high as the top of the rear corner of the door. The main hoop must be high enough that a straight line drawn from the top of the main hoop to the top of the front hoop would pass over the driver's helmet and steering wheel when the driver is seated in the normal driving position. Additionally, the top of the main hoop must be at least 2 inches above the driver's helmet as illustrated in figure 10.

**c.** On open cars retaining the windshield frame the main hoop must be full height for the entire width of the hoop. The top of the main hoop must be at least 2 inches above the driver's helmet.

### **2. Main Hoop Bracing**

**a.** Main hoops shall incorporate a diagonal brace. The brace shall either be in the plane of the main hoop or extend from the top of one rear brace to the bottom of the opposite rear brace. Automobiles with mid mounted engines can

have the lower mounting point attach to the frame of the automobile within six inches of the main hoop. In the case of braces in the plane of the main hoop, the brace must span at least 50% of the width of the main hoop, and at least 75% of the height of the main hoop as shown in figure 12.

**b.** Cars must incorporate a main hoop horizontal brace at the approximate level of the driver's shoulders but not lower than the shoulder belt mounting point as described in the section on Driver's Restraint Systems. If a double-diagonal "X" brace is used in the plane of the main hoop, a half-width horizontal brace may be used behind the driver's seat to mount the seat back and shoulder harness.

**c.** Cars must have 2 braces extending to the rear from the main hoop and attaching to the frame or chassis. Braces must be attached as near as possible to the top of the main hoop (not more than 6 inches below the top), and at an included angle of at least 30 degrees.

**d.** Open cars must have 2 braces extending forward from the main hoop and attaching to the front hoop, not more than 6 inches below the top of the front and main hoop. It is recommended that the front and rear braces attach to the main hoop as close as possible to each other.

**e.** On cars where the rear window/bulkhead prohibits the installation of rear braces (e.g. Honda del Sol), the main hoop shall be attached to the body by plates welded to the cage and bolted to the stock shoulder harness mounting points. This installation design must incorporate a diagonal bar connecting the top of the main hoop to the lower front passenger side mounting point (Petty Bar). Alternatively, the rear window may be removed and a clear, lexan replacement installed. The rear cage braces may pass through this replacement window and through the engine cover or bodywork to allow connection to the frame or unibody.

### **C. FRONT HOOP**

1. Roll cages may be of two designs, low front hoop or high front hoop. All closed top cars and cars that retain the windshield frame must have a high front hoop design. Open cars may incorporate a high or low front hoop design. High front hoop are also referred to as side hoops.

**a.** Closed cars: The front hoop (side hoop) must follow the line of the A-pillars to the top of the windshield and be connected by horizontal bars to the top of the main hoop on each side (as close to the roof as possible). Instead of a single front hoop, two side hoops (down tubes) may be used. Alternatively, a top "halo" hoop following the roof line from the main hoop to the windshield with forward down tubes following the A-pillars to the floor may be used. Regardless of which one of the two approved tubing configurations there shall be a tube connecting the two A-pillar tubes at the top of the windshield.

**b. Open cars** The height of the front hoop must be consistent across the full width of the cockpit.

**c. Front Hoop Bracing** All open cars with a high front hoop and all tube frame closed cars must incorporate a horizontal front hoop brace at the approximate level of the dashboard. It is recommended production-chassis cars also have the front hoop brace.

2. One tube may extend, from each front down tube, forward to the firewall or through the firewall. It is recommended this tube, one on each side, must connect to the chassis at a point not more than 12 inches forward of the front axle centerline.

#### **D. SIDE PROTECTION**

1. Side tubes connecting the front and main hoops across both door openings are mandatory. Tubes that are welded to any part of the same mounting plate are considered to be connected to one another (see 9.4.E.3 below).

2. NASCAR-style side protection or one bar bisecting another to form an "X" is permitted. Door side tubes may extend into the front door.

**a.** Door window glass, window operating mechanism, inner door trim panel, armrest, map pockets, wiring harnesses for door locks, windows, power mirrors, seat wiring, etc., and inside door latch/lock operating mechanism may be removed and the inner door structural panel may be modified, but not removed only if the door bars extend into the door cavity.

**b.** The stock outside door latch/lock operating mechanism shall not be removed or modified unless specifically authorized in the rules.

**c.** For any vehicle modifying the stock side impact beams, NASCAR style door bars are mandatory.

#### **E. ROLL CAGE ATTACHING POINTS**

1. Production chassis cars –The roll cage must attach to the vehicle structure within the passenger compartment in a minimum of 6 points as specified in these rules.

2. Tube frame cars –The roll cage shall be integrated into the frame or chassis.

#### **3. Mounting Plates**

**a.** Mounting plates welded to the structure of the car shall not be less than .080 inches thick and no more than 0.25 inches thick. Plates may be on multiple planes.

**b.** The thickness of mounting plates bolted or riveted to the structure of the car must not be less than the thickness of the roll hoop or brace that they attach to the chassis and must be backed up with a plate of equal size and thickness on

the opposite side of the chassis panel. Plates may be on multiple planes but shall not be greater than 15 inches on any side.

c. Fasteners for bolted or riveted mounting plates must be Grade 5/Metric 8.8 or better with a minimum diameter of 5/16”.

#### F. TUBING

1. Seamless or DOM mild steel tubing (SAE 1020 or 1025 recommended) or alloy steel tubing (SAE 4130 or T45) , or Docol R8 tubing must be used for all roll cage structures. Alloy and mild steel tubing may not be mixed. ERW tubing is not allowed.

2. The following table shows the minimum allowed tubing outer diameter and wall thickness by vehicle weight:

Vehicle Weight Tubing Size (inches)	(outer diameter x wall thickness)
Up to 1700 lbs	1.375 x .080
1701 - 2699 lbs	1.500 x .095 1.625 x .080
2700 lbs and up	1.50 x .120 1.750 x .095 2.00 x .080

3. For purposes of determining tubing sizes, the vehicle weight is as raced without driver, fuel and ballast. The minus tolerance for wall thickness should not be less than .010” below the nominal thickness.

4. The required tubing elements must meet the material minimums set forth above. Optional tubing elements may be any size.

5. The minus variance of tubing wall thickness due to manufacturing tolerances is limited to .010 inch.

6. Either an inspection hole between 3/16 and 1/4 inch diameter must be drilled in a non-critical area of the front and rear hoops, as well as one of the supplemental braces to facilitate verification of wall thickness; or alternatively, wall thickness may be determined by non-invasive means and noted in the logbook as inspected by such means.

#### G. BASIC DESIGN CONSIDERATIONS

1. All portions of the roll cage subject to contact by the driver must be padded with a minimum 1 inch of material. Padding that meets or exceeds SFI 45.1 or FIA 8857-2001 (curved padding), or SFI 45.2 or FIA sports car head rest material (flat padding) specification is recommended.

2. No portion of the roll cage may have an aerodynamic effect by creating a vertical force.

3. The radius of all bends in the roll cage (measured at centerline of tubing) must not be less than 3 times the diameter of the tubing.
4. It is recommended that all joints of the roll cage be welded. All welding must include full penetration, no cold lap, no surface porosity, no crater porosity, no cracks, no whiskers, and so forth. Welds shall be continuous around the entire tubular structure. Procedures for welding alloy steel shall be in accordance with accepted industry practice. It is recommended that a certified AWS D1.1 welder do all welding.
5. It is recommended that gussets be used at all joints.
6. Any number of additional tube elements is permitted within the boundaries of the cage structure. Such tube elements may pass through any mandatory or optional bulkhead or panel separating the driver/passenger compartment from the trunk/cargo area/fuel tank/fuel cell area provided the bulkhead is sealed around such tube elements.
7. Removable roll cage bracing is acceptable in one of the following configurations:
  - a. If one tube fits inside another tube to facilitate removal, the removable portion must fit tightly and must bottom by design, and at least 2 bolts must be used to secure each joint. The telescoping section must be at least 8 inches long. The minimum bolt diameter is 3/8 inch.
  - b. Removable bracing may incorporate connectors of the double-lug, double ear-type, tapered, or muff-type as shown in figures 14 and 15. The double-lug type must include a doubler, gusset, or capping arrangement to avoid distortion or excessive strain caused by welding. Double ear-type joints must be fully welded at all the mating surfaces.

## **10. MANUFACTURER SUPPLIED/FIA/MSA HOMOLOGATED ROLL CAGES**

1. Cars may compete with FIA or FIA-Approved Test Houses homologated cages provided the cage was built by the manufacturer or a manufacturer designated shop/team and approved for use. Cars must have the FIA identification plate attached to the cage along with a letter from SCCA Technical Services certifying the origins of the car, or confirmation that the cage was certified by an FIA-Approved Test House.
2. Cars may compete with an approved MSA (Motor Sports Association UK) Roll Over Protection System Certificate. All related engineering drawings and documents shall be submitted to SCCA Technical Services. Cars must have MSA identification plate attached to the cage along with a letter from SCCA Technical Services certifying the cage was approved by the MSA.