

## CSCC Convertible Roll Bar Requirements

**Convertibles.** Convertibles are defined as cars with retractable tops, whether soft-top or folding hardtop. Convertibles are not allowed to participate in sessions driven at speed without a roll bar and a 5- or 6-point harness for each occupant. Arm restraints are strongly recommended. The use of a roll bar meeting the minimum requirements described in Appendix A is strongly recommended. Cars equipped with only factory pop-up posts are not allowed. Removable roof sections include Targa tops and T-tops. These are characterized by part of a fixed body structure above the passenger compartment.

Convertibles are not allowed to participate in sessions driven at-speed unless the car is equipped with the following minimum requirements:

- a. A roll bar or roll cage meeting the requirements of Appendix A; and
- b. A 5- or 6-point harness for both driver and instructor.

At the discretion of the Member Club, cars with factory-installed, fixed rollover protection or removable roof sections may be allowed, but only if this protection meets the Helmet Reference Plane described in Figure 1 in Appendix A for both the driver and passenger.

Cars equipped only with factory pop-up posts or similarly activated rollover protection is not allowed.

Member Clubs may elect to exclude convertibles or cars with removable roof sections entirely from sessions driven at-speed regardless of roll bar or fixed rollover protection. Cars with factory installed, fixed rollover protection (targas, T-tops, etc.) are a Member Club decision. Exclusion of convertibles is also a Member Club option.

### Appendix A - ROLLBARS FOR CONVERTIBLES

These specifications are for inspecting convertible rollbars and represent minimum requirements. The words "shall" and "shall not" indicate that the specification is mandatory. Convertible roll bars shall be inspected by and are subject to approval by the Chief Technical Inspector at each event.

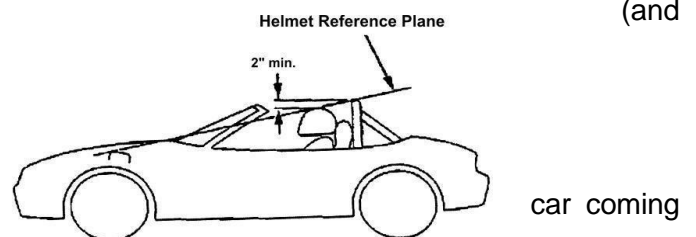
#### A.1 Basic Design Considerations

**A.1.1** The basic purpose of the roll bar is to assist in the protection of the driver (and passenger) if the car turns over or is involved in a collision. This purpose should not be forgotten.

**A.1.2** The top of the roll bar shall not be below the top of the driver's (and passenger's) helmet with the driver (and passenger) seated normally, and restrained by seatbelt/shoulder harness, and shall not be more than six inches behind the driver. It is recommended the roll bar be at least two (2) inches above the top of the driver's (and passenger's) helmet or the top of the roll bar shall be a minimum of two (2) inches above the top of the driver's (and passenger's) helmet with the driver (and passenger) seated normally, and restrained by seatbelt/shoulder harness. A plane (Helmet Reference Plane) drawn from the top (not including padding) of the roll bar to structural parts of the chassis in front of the base of the windshield (e.g., top of front suspension strut towers) shall pass over the driver's (and passenger's) helmet. (See Figure 1))

Figure 1. Helmet Reference Plane

**A.1.3** The roll bar shall be designed to withstand compression forces resulting from the weight of the



down on the roll bar, and to take fore, aft and lateral loads resulting from the car skidding along the ground on the roll bar.

**A.1.4** The roll bar shall extend the full width of the cockpit.

**A.1.5** Any portion of the roll bar or bracing that might be contacted by the driver's (and passenger's) helmet shall be covered with non-resilient material such as Ethafoam or Ensolite, or other similar material, with a minimum thickness of one-half ( $\frac{1}{2}$ ) inch. The energy absorbing material shall be firmly attached.

## **A.2 Material**

**A.2.1** The roll bar hoop and all braces shall be seamless, ERW (Electric Resistance Welded) or DOM (Drawn Over Mandrel) mild steel tubing (SAE 1010, 1020, 1025 or equivalent), or chrome molybdenum alloy steel tubing (SAE 4125, 4130 or equivalent). It is recommended that mild steel tubing be used as chromium alloys present difficulties in welding and must be normalized to relieve stress. Proof of the use of alloy steel shall be the responsibility of the participant.

**A.2.2** The size of the tubing shall be determined based on the vehicle curb weight as follows:

Vehicle Curb Weight Roll bar Mild Steel

Under 2,000 lbs. 1.50 x 0.120 or 1.75 X 0.090

2,001 lbs. – 3,500 lbs 1.75 x 0.120

Over 3,500 lbs. 2.00 x 0.120 (Outside Diameter x Wall Thickness in inches)

The minus tolerance for tubing diameter and wall thickness shall not be less than 0.010-inch below the nominal value. An inspection hole of at least  $\frac{3}{16}$  inch diameter shall be drilled in a non-critical area of the roll bar hoop to facilitate verification of tubing wall thickness. Where bolts and nuts are used, the bolts shall be at least  $\frac{3}{8}$  inch diameter SAE Grade 5 or equivalent.

## **A.3 Welding**

**A.3.1** Welding shall conform to American Welding Society D1.1, Structural Welding Code, Chapter 10, Tubular Structures. Welds shall be visually inspected and shall be acceptable if the following conditions are satisfied:

**A.3.2** The weld shall have no cracks.

**A.3.3** Thorough fusion shall exist between weld metal and base metal.

**A.3.4** All craters shall be filled to the cross-section of the weld.

**A.3.5** Undercut shall be no more than 0.01-inch deep.

## **A.4 Roll Bar Hoop**

One (1) continuous length of tubing shall be used for the roll bar hoop with smooth, continuous bends and no evidence of crimping or wall failure. The radius of the bends in the roll bar hoop (measured at centerline of tubing) shall not be less than three (3) times the diameter of the tubing. The roll bar hoop shall have a maximum of four (4) bends totalling 180 degrees  $\pm$  10 degrees. Whenever possible, the roll bar hoop should start from the floor of the car

## **A.5 Bracing**

**A.5.1** Roll bar hoops shall have two (2) fore/aft braces with tubing diameter and wall thickness as listed in A.2.2. The fore/aft braces shall be attached as close as possible to the top of, but not more than six (6) inches below, the roll bar hoop. The included angle between the fore/aft brace and the vertical part of the roll bar hoop shall be no less than 30 degrees. The fore/aft braces shall have no bends.

**A.5.2** Roll bar hoops shall have a diagonal brace with tubing diameter and wall thickness as listed in A.2.2 to prevent lateral distortion of the hoop. The diagonal brace shall be attached at the bottom corner of the roll bar hoop on one side and the top corner of the roll bar hoop on the other side. The diagonal brace shall have no bends.

## **A.6 Mounting Plates**

**A.6.1** Roll bar hoops and fore/aft braces shall be attached to the chassis of the car with mounting plates that are at least 3/16-inch thick.

**A.6.2** Carpet/padding/insulation shall be removed under the mounting plates.

**A.6.3** Mounting plates shall be either welded or bolted to the chassis.

**A.6.4** Mounting plates bolted to the chassis shall have a back-up plate of equal size and thickness on the opposite side of the chassis with the plates through-bolted together. Whenever possible, the mounting plate should extend onto a vertical section of the chassis panel.

**A.6.5** There shall be a minimum of three (3) bolts per mounting plate, if bolted.

**A.6.6** The through holes for the bolts shall be a minimum of  $\frac{3}{8}$  inches from the edge of the mounting plate.

**A.6.7** Each mounting plate shall be no more than 100 square inches in area and shall be no greater than 12 inches, nor less than 2.5 inches, on a side.

**A.6.8** The mounting plate may be multi-angled, but shall not exceed the dimensions in A.6.7 in a flat plane. (Fall 2010)