ROLL BAR STANDARDS

A. BASIC DESIGN CONSIDERATIONS

1. The basic purpose of the roll bar is to protect the driver in case the vehicle rolls over. This purpose should not be forgotten.

2. The top of the roll bar shall not be below the top of the driver's helmet when the driver is in normal driving position, and shall not be more than six inches behind the driver. It is strongly suggested that the roll bar extend at least three inches above the driver's helmet. In case of two driver cars, both drivers must be within the roll bar height requirement, however only one driver must be within six inches of the roll bar. In a closed car equipped with a roll bar/cage, it must be as close as possible to the interior top of the car.

3. 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.

4. The two vertical members forming the sides of the hoop shall not be less than fifteen inches apart (inside dimension). It is desirable that the roll bar extend the full width of the cockpit to provide maximum bearing area in all soil conditions during rollovers. The roll bar vertical members on formula cars and other single seat cars with a center driver position must be not less than fifteen inches apart, inside dimension, at their attachment points to the uppermost main chassis member.

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

6. It is recommended that steel gusset plates be used at all welds. Gussets should be at least two inches long on each leg and 3/16 inches thick.

7. It is recommended that roll bars be coated only with a light coat of paint. If, however, a roll bar should be chrome-plated, it is recommended that the structure be normalized.

8. Post or tripod types of roll bars are not acceptable.

B. MATERIAL

After 9-22-85, aluminum is not an acceptable alternate material. Cars using aluminum roll bars or roll cages must file proof with the SD that the structure was approved prior to 9-22-85 as 212 rovided in this section.

1. The roll bar hoop and all braces must be of seamless, ERW, or DOM mild steel tubing (SAE 1010, 1020, 1025) or equivalent, or alloy steel tubing (SAE 4130). It is strongly recommended that roll bars not be constructed of ERW due to quality and strength concerns.

2. The size of tubing to be used shall be determined on the basis of the weight and speed potential of the car. The following minimum sizes are required required and are based upon the weight of the car without the driver.

a) Over 1500 lbs.-min. of 1-1/" 2 o.d. x .120" wall or 1-3/ 4" o.d. x .095" wall
b) Over 1000 lbs.-min. of 1-1/4" o.d. x .090" wall
c) Under 1000 lbs.-min. of 1" o.d. x .060" wall

Dimensions are nominal. 0.005" variation in wall thickness is allowed.

3. Each mounting plate shall be at least .080" thick if welded and 3/16" thick if bolted. A minimum of 3 bolts per plate is required for bolted mounting plates.
4. All bolts and nuts shall be SAE Grade 5 or better, 5/16" minimum diameter.

C. FABRICATION

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

2. All welding must be of the highest possible quality with full penetration and will be subjected to very critical inspection. Arc welding, particularly heliarc, should be used wherever possible.

D. BRACING

1. It is recommended that braces be of the same size tubing as used for the roll bar itself.

2. All roll bars must be braced in a manner to prevent movement in a fore-and-aft direction with the brace attached within the top one-third of the roll hoop, and at an angle of at least thirty degrees from vertical. It is strongly recommended that two such braces 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.

3. It is suggested that roll bars include a transverse brace from 213 the bottom of the hoop on one side to the top of the hoop on the other side.

E. MOUNTING PLATES

1. 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.

2. In the case of cars with unitized or frameless construction, mounting plates may be used to secure the roll bar structure to the floor of the car. 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.

F. REMOVABLE ROLL BARS

Removable roll bars and braces must be very carefully designed and constructed to be at least as strong as a permanent installation. If one tube fits inside another tube to facilitate removal, the removable portion must bottom on the permanent mounting, and at least two bolts must be used to secure each such joint. The telescope section must be at least eight inches in length.

G. INSTALLATION ON CARS OF SPACE FRAME AND FRAMELESS DESIGN

1. It is important that roll bar structures be attached to cars in such a way as to spread the loads over a wide area. It is not sufficient to simply attach the roll bar to a single tube or junction of tubes. The roll bar must be designed in such a way as to be an extension of the frame itself, not simply an attachment to the frame. Considerable care must be used to add as necessary to the frame structure itself in such a way as to properly distribute the loads. It is not true that a roll bar can only be as strong as any single tube in the frame.

H. ROLL CAGES

It is recommended but not mandatory that all cars utilize a roll cage as defined in Section 18 of the GCR.

I. ROLL BAR PADDING

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.