

ROLLCAGES: UP TO JANUARY 1, 2000
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FOR REFERENCE ONLY NOT APPLICABLE FOR NEW VEHICLES

30. ROLLCAGES: UP TO JANUARY 1, 2000

The following rollcage specifications are for reference purposes only for cars with log books issued before January 1, 2000. Please see regulation NRR 12.3.2 for new rollcage requirements.

30.1 Roll Over Protection.

30.1.1 Roll cages are mandatory for all vehicles.

30.1.2 Specific roll over protection is subject to the approval of the scrutineer at each event.

30.1.3 Basic design considerations:

30.1.3.1 The basic purpose of the roll over protection is to protect the crew if the car rolls over or is involved in a serious accident.

30.1.3.2 The roll over protection 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.

30.1.3.3 The main roll bar hoop must extend the full width of the passenger compartment and must be a minimum of 5 cm above the top of the driver's helmet with the driver sitting in the normal position, or as near the roof as possible in closed cars, and shall not be more than 25 cm behind the back of the driver's helmet. In roll cage construction, a similar hoop must be in front, supporting the front pillars, with horizontal braces connecting the front hoop to the main hoop at each side of the top.

30.1.3.4 It is recommended that any portion of the roll over protection which might be contacted by the driver's or co-driver's helmet be covered with Styrofoam or other energy-absorbing, high-density material to a minimum thickness of 25 mm and this padding be covered by duct tape or similar protective wrapping.

30.1.3.5 For roll cage construction, a lower side bar joining one main hoop and the front hoop on each side of the structure is required. This bar should be installed no higher than one-third of the distance from the floor to the top of the main hoop.

30.1.4 Material.

30.1.4.1 The roll over protection must be of Seamless, ERW, or DOM mild steel tubing, or chrome molybdenum, alloy steel such as SAE 4125 or SAE 4130. It is recommended that mild steel tubing be used as chromium alloys present difficulties in welding and must be normalised to relieve stress. Proof of the use of alloy steel will be the responsibility of the entrant.

30.1.4.2 The size of tubing to be used shall be determined from the following table.

Vehicle Weight	Mild Steel		Alloy Steel	
	Diameter	Wall Thickness	Diameter	Wall Thickness
Under 1500 lb (680 Kg)	1.5" (38mm)	0.095" (2.4mm)	1.375" (35mm)	0.090" (2.3mm)
1500-2500 lb (680-1140 Kg)	1.5" (38mm)	0.120" (3.0mm)	1.5" (38mm)	0.090" (2.3mm)
Over 2500 lb (1140 Kg)	1.75" (44mm)	0.120" (3.0mm)	1.625" (41mm)	0.090" (2.3mm)

An inspection hole of at least 4.5 mm diameter must be drilled in a non-critical area of the main hoop to facilitate verification of wall thickness.

30.1.4.3 Where nuts and bolts are used, the bolts shall be at least 9 mm diameter, SAE grade 5 or equivalent.

30.1.5 Fabrication.

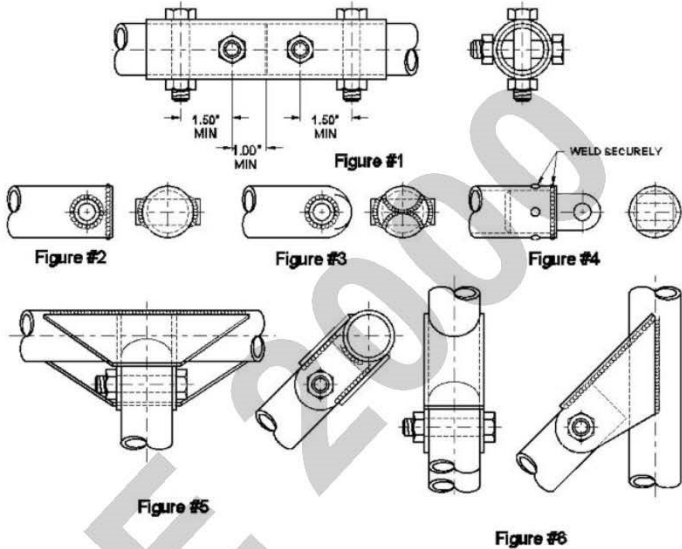
30.1.5.1 One continuous length of tubing must be used for each of the hoops with smooth continuous bends and no evidence of crimping or wall failure.

30.1.5.2 Two rearward facing fore-aft braces must be installed from the main hoop. This bracing must be attached as near as practical to the top of the hoop and at an angle of at least 30 degrees from vertical.

30.1.5.3 If the fore-aft bracing must be removable, the connection between the hoop and the braces must be of the double-lug type, fabricated from material of at least 5 mm thickness and welded through a doubler

or gusset arrangement to avoid distortion or excessive strain caused by welding. Details of the attachment of removable braces follow.

- 30.1.5.4 The fore-aft braces, if removable, should be attached to a rear chassis member through a double-tug connection as described above. If attached to the engine, it must mount to a major component such as a head stud.
- 30.1.5.5 If one tube fits inside another tube to facilitate removal, the outer sleeve must fit tightly and the inner tubes must bottom together (see Figure #1). At least two bolts must be used at each end to secure such a joint and the telescope section must be at least 20 cm in length.



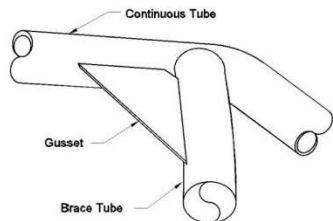
30.1.6 Mounting plates.

- 30.1.6.1 In cars with frame-type construction, the roll over protection must be attached to the frame wherever possible. Mounting plates bolted or welded to the frame must be at least 5 mm thick.
- 30.1.6.2 In cars with utilised or frameless construction, or cars with frames where frame mounting the roll over protection is impractical, mounting plates must be used to secure the structure to the floor of the car. The important consideration is that the loads be distributed over as large an area as possible.
- 30.1.6.3 Mounting plates bolted to the structure shall not be less than 5 mm thick, with a backup plate of equal size on the opposite side of the panel with the plates through-bolted together.
- 30.1.6.4 Mounting plates welded to the structure shall not be less than 2 mm thick. Wherever possible the mounting plate should extend onto a vertical section of the structure such as a door pillar.
- 30.1.6.5 The important consideration is that the load be distributed over as large an area as possible. Mounting plates shall have a minimum area of 16 square inches or 100cm².

30.1.7 Gussets

Gussets or corner braces joining the front continuous tubing, whether "front hoop" or "side hoop", and the brace tubing are required. The gusset or brace shall span the weld that joins the two tubes and may be positioned either in the roof quadrangle or in the windshield area.

If gussets are used they must be of a thickness equal to the wall thickness of the roll cage tubing and must be a minimum of 5 cm long where they contact the roll cage tubing. They must be welded along this entire length and relieved in the corners so as not to interfere with existing



welds.

If corner braces are used they must be of tubing a minimum of 2 cm in diameter and 0.060" (1.524 mm) wall thickness. It must span at least 13 cm across the corner at its longest point.

In either case gussets may be fitted parallel to the roof or parallel to the windshield.

30.1.8 Other roll over protection designs.

30.1.8.1 Roll over protection of alternate material or design may be accepted by the scrutineer provided the entrant can produce a certificate complying with the following requirements:

- (a) The certificate must specify that the construction is capable of withstanding three simultaneously applied loads:
 - 1.5 g lateral
 - 5.5 g fore/aft
 - 7.5 g vertical
- (b) The induced loads are to be carried over into the primary structure. The mass of the car to be used in these calculations is its mass in starting order with the driver and co-driver aboard and full fuel tanks.
- (c) The certificate must be accompanied by a drawing or a photograph of the roll cage.
- (d) The certificate must be signed by a qualified technician.

30.1.8.2 FIA roll cages are acceptable. See FIA regulations.