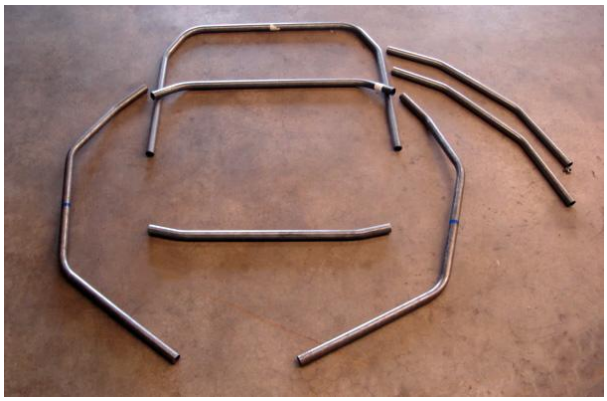
Roll Cage Installation Manual

The Advanced Autosports Spec Miata Roll Cage is designed with Safety, Comfort and Space as the primary concerns. The main hoop and cage sides should be fit as tight as possible against the body of the car.

Throughout this manual, I will explain how Advanced Autosports installs the cage in all of our customer cars and our own cars. I will also explain why we do it this way.

I recommend removing the windshield prior to cage installation. Weld splatter will "pit" the glass. Having the glass out, makes welding the front bars easier. Most local glass shops can remove the windshield, usually without breaking it, for less than $100.

The first thing I would like you to do is layout all your tubes on the floor.



This pic shows the tubing for the Advanced Autosports basic roll cage kit

If you purchased the Advanced Autosports basic kit you should have the following seven (7) bent tubes:

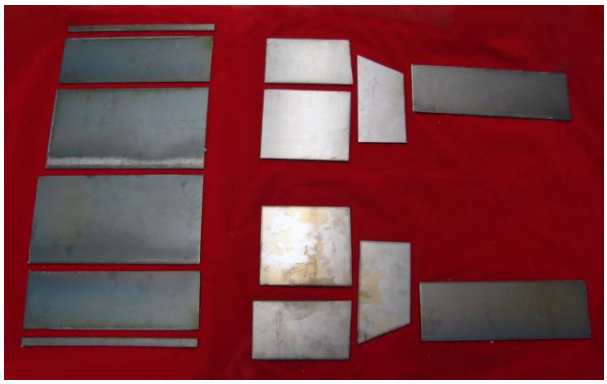
1-Main Hoop
1-Harness Bar
1-Upper Windshield Bar
1-Left Cage Side
1-Right Cage Side
2- NASCAR bars

A deluxe roll cage kit should look like this

If you purchased the Advanced Autosports Deluxe roll cage kit, you will have the seven pre-bent tubes listed above, plus the additional passenger Nascar bars (and their uprights). Plus, the following straight tubes:
2-48" Trunk Braces
1-46" Trunk Diagonal Bar
1-30" Trunk Cross Bar
1-48" Main hoop Diagonal bar
1-6" Diagonal bar center support
1-48" Dash Bar
4-12" Door Bar Uprights

The deluxe kit also includes a small aluminum tab to hold the defroster ducts in place, 14 pieces of pre cut steel footings and a 10 pack of 3-dimensional gussetts.

Defroster duct mounting tab



14 pieces of precut steel footings

Preformed 3- dimensional gussetts

Optional bars include; two 10" long tubes of 1” diameter tubing (windshield diagonal), a bent tube of 1” diameter (HANS bar), and a center roof bar.

Optional HANS bar

Optional windshield diagonals and center roof bar

Advanced Autosports offers our Nascar style door bars as an add on kit for universal use.

All tubes are slightly longer than needed and will be cut to fit. I like to “sneak-up” on my cuts. It’s better to make 2 small cuts than one too big of a cut. You will need some type of a tubing notcher or a grinder to “fish mouth” the tube for proper joints.

I use a MIG welder for all my cages. Feel free to TIG weld it if you like. The cage is made from mild steel and requires no special equipment. Proper welding techniques and

precautions should be used. I recommend you remove the battery and ECU from the car prior to welding.

The pictures shown here, are of roll cages we have built at Advanced Autosports using the same cage kit that you have purchased. I estimate about 20 hours for us to build a cage. I expect that you will spend double that, or more. Don't feel bad, that is how long it took us the first time.

These pictures are of multiple cars and multiple years. They are shown for clarification purposes only. FYI, the black car is a 1999, the blue one is a 1990 and the red one is a 1992.

NOW GET TO WORK!

The interior must be completely removed. I recommend removing the 3 heater components and the heavy black insulation mat behind them. Removing the shifter will save a lot of climbing around. Cover the shifter hole with a rag or tape.

We install the front cage footings while the heater components are removed.

The front footings are designed to meet the SCCA requirement of 144 square inch maximum. They are long enough to reach to the firewall/floor seam and the vertical seam on the rocker panel. Installing these footings properly, effectively seam welds the front of the car.

Three 1/8" steel plates are used, one on the floor, one against the rocker and the narrow piece on top of the rocker.

Picture of drivers front footings tack welded in place

The oem rear gusset has been removed.
The "camel hump" remains

The main hoop footings are located on the floor. Some cages sit on the parcel shelf. I feel our design is much stronger and safer. Many people argue that going to the floor takes up seating space. In actual practice, it does not. Your seat will clear the main hoop down tubes. You are going to remove the factory corner braces. You can drill out the spot welds, grind them off or use a plasma cutter.

Most Spec Miatas have the rear seat mounts (often called Camel Humps) removed. Most seats are mounted directly to the floor. You may as well remove the seat mounting humps while you are removing the corner brackets. The main hoop footings are 3 pieces, floor, side and back. You may need to sand the edges to get a perfect fit.

2 pix of the main hoop footing,
NOTE: hole in side plate for access
to factory seat belt hole

The rear footing supports go in the trunk. The passenger side footing will be next to the battery. Look at which holes are used for the battery hold down brackets and do not weld over them.

The passenger side trunk plate near the battery.

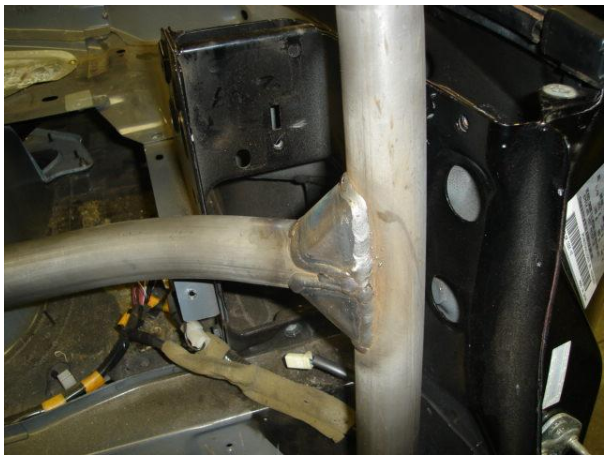
The plastic dash will need to be separated from the factory dash bar. There are about 40 Phillips head screws holding them together. Reinstall the 3 heater components and the factory dash bar, but leave the plastic dash on the workbench.

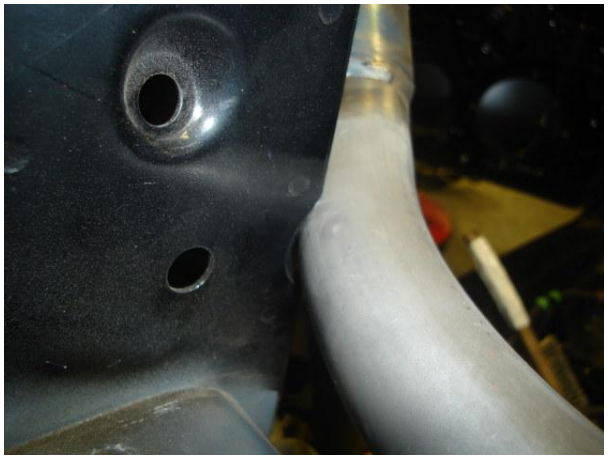
The Advanced Autosports kit is designed so that the windshield defrosters are fully operational. Since the defroster ducts are attached to the dash panel from the factory, it is necessary to use the Defroster Duct Mounting Tab included with your deluxe kit, to hold the ducts in place.

The little silver bracket holds the defroster ducts
in the proper position

The first item to test fit is the main hoop. Install the hardtop and trim the legs to fit as close to the roof as possible. The main hoop should tilt rearward at about 14 degrees.

Note the angle of the main hoop





3 different views of the "notch" in the seat belt towers.

The horizontal brace, we call it the "harness bar", is easier to fit before the main hoop is welded in place. In the factory "seat belt towers" there is a small notch. I position the horizontal bar so it passes through these notches when installed. You may wish to enlarge these notches for ease of installation. Tack weld the cross bar to the main hoop and test fit. Test fit the sheet metal gas tank shield; it may require a little "adjusting" to fit properly.

Once everything fits properly, remove the assembly and install the diagonal bar. I always weld the main hoop/cross bar and diagonal bars together as an assembly, on the floor, prior to installing it in the car. Once the welding is complete, I tack weld the bottom of the main hoop in place.

This main hoop is completely welded and ready for installation

This shows the 3-dimensional gussets installed in the main hoop area

I install the rear section next. Use care when drilling the holes through the rear bulkhead. Using a long drill bit, I drill a pilot hole first. A piece of tig welding rod or a straightened coat hanger can be used to check the alignment before using a hole saw to make the larger holes.

The curvature of the body will fool the eye into misaligning the 3 holes in the rear bulhead. This straight rod helps with proper alignment.

Tack weld everything before final welding.

Note how all 3 tubes are welded together in the trunk

This is the left rear mount on an NB car

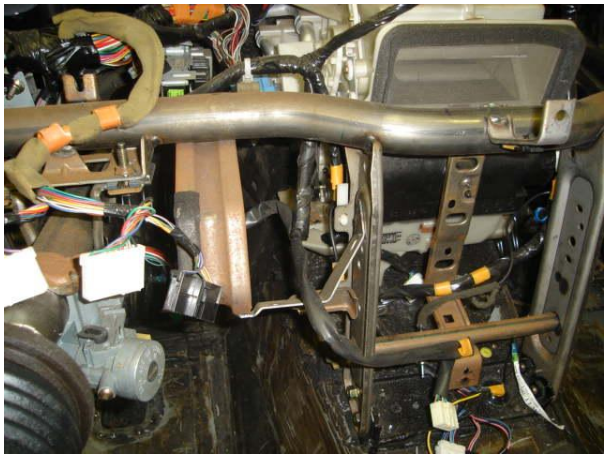
The Advanced Autosports Spec Miata Roll Cage has been designed with longer rear support braces than many other manufacturers. By bringing the supports farther back into the trunk, we have greatly increased the strength of the trunk in the event of a rearward collision (i.e. backing into a wall). I have seen several cars that would not have been repairable with short rear braces, that due to our longer braces, needed only cosmetic body repairs.

The cage sides are mirror images of each other. Use care in determining which side is which. You will need to trim some braces from the factory dash bar for installation. In this case, pictures are worth more than words. An NB car is shown, NA cars are similar

Left side prior to trimming

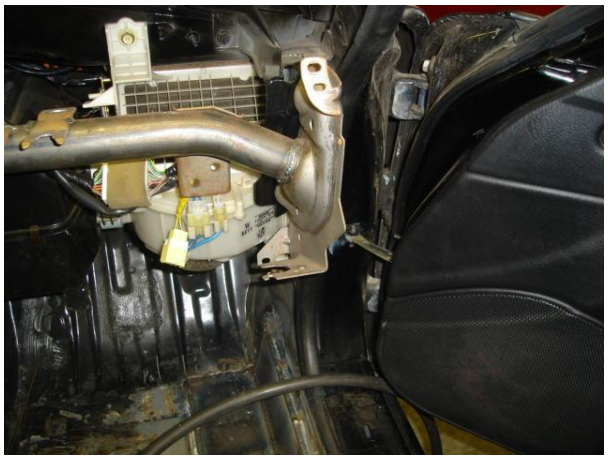
Left side after trimming

Left side, with cage side and dash bar in place



Some braces need to be removed in the center dash area

The 2 pix above are before and after
the center dash area is trimmed



More trimming is required on the right side of the factory dash bar. Here is before.

And here is after the trimming.

The Miata is a small car, getting every ¼" of space is important. Both head and foot room is at a premium in a Spec Miata. The factory dash bar is not structural to the car. Its' primary purpose is to hold the dash and steering column in place. Careful trimming of the factory dash bar will allow the front of the cage side to be mounted flush against the rocker panel or even set partially on top of the panel.

This left front bar leaves plenty of room for the drivers feet and the factory dead pedal.

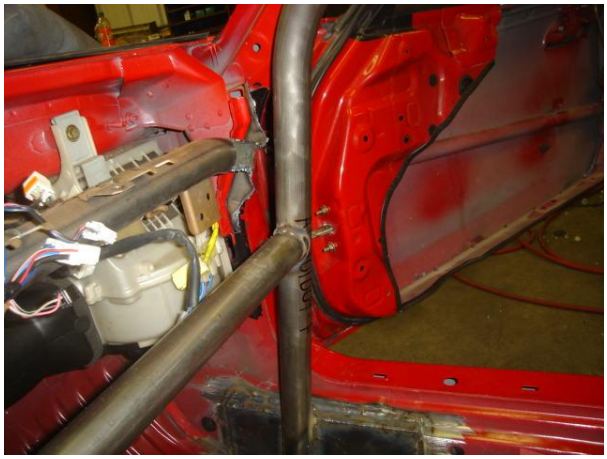
Keep the bars as tight to the windshield pillar and the roof as possible. Tack the cage sides in place. Then fit the upper windshield bar and tack it in place. This is much easier with the windshield removed.

The optional windshield diagonal bar acts as a stiffener and also as a handle for getting out of the car.

This first generation car requires less trimming then the NB cars

Fitting the dash bar (also referred to as a "knee" bar) requires care, not to cut it too short. You may need to trim a small "NUB" from the white heater box for clearance of this tube. You will need to wedge the dash bar into place with a hammer. Once the dash bar is installed, weld the forward section of the cage.

The nub, before and after removal



This pic shows a completed front section
prior to installing the dash pad and door bars

I like to install the right side door bars next. The lower bar is parallel to the ground and should be about 2" above the door sill pinch weld.

Make sure the door will close before final welding of the lower door bar.

Angling the upper door bar improves the drivers' ability to easily get into and out of the race car.

I like to weld the lower bar completely, and then tack the upper bar. I then fit the vertical tubes, tack them in place before welding the upper bar and the vertical tubes.

For the most strength, the NASCAR bar should attach to the upright as close to the harness bar as possible.

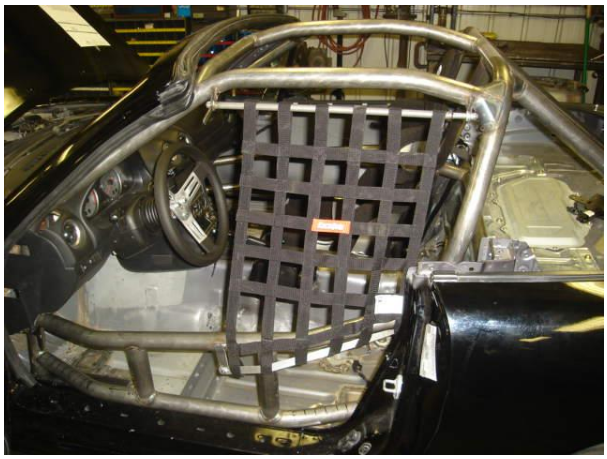
Install the driver's side lower door bar the same as the passenger side. I fit and install the drivers seat prior to notching the drivers side upper door bar. This makes seat installation much easier. Fit the upper bar with the seat in place; tack it in before removing the seat. If you have chosen a seat with shoulder wings, it may be necessary to lower the rearward end of the upper door bar for clearance. Keep the bar

as close to the harness bar as possible for improved safety. Fit the vertical tubes, then weld the upper bar and vertical tubes.

Most composite sets (Sparco, OMP etc.) will require a floor notch out panel for additional seat clearance. Large size aluminum seats will benefit from the notch out panel. Do not cut the hole in the floor until the lower door bars have been installed and welded into place. The transmission tunnel provides rigidity in the front to back of the car. Cutting a large hole, without having the added strength of the door bars, could cause the chassis to flex.

This East Street Racing Floor Notch Out Panel is available from Advanced Autosports. It provides additional floor clearance for larger seats.

You may wish to incorporate the seat back brace into the cage. If so, do that now.



The lower window net mount is welded to the cage per SCCA rules. Nets must release from the top.

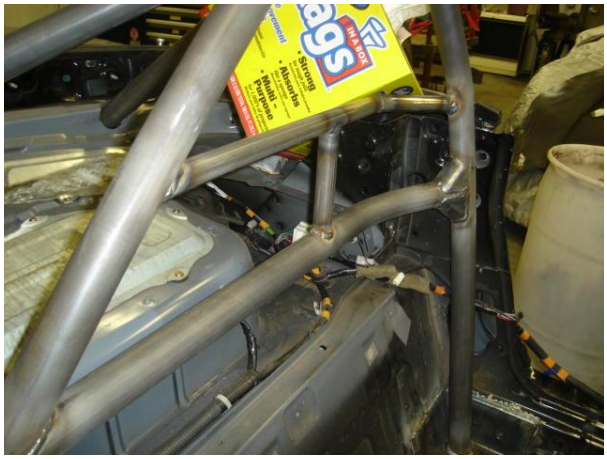
This pic shows a weld-on master switch tab

The preformed gussets can be installed in any corner you prefer. If using a weld on window net or master switch, install those tabs next.

Advanced Autosports offers a custom made window net that fits our door bar design. The longer mounting straps in the front work perfectly with the angled door bars. The net is SFI approved.

As an option, Advanced Autosports offers a roof bar. This bar is located between the main hoop and windshield bar, longitudinally in the car.

You may wish to offset the roof bar slightly for additional helmet clearance.



This extra bar is for use with a HANS Device.
If you are using a HANS,
follow their instructions for seat belt routing

Many sanctioning bodies require the use of a head and neck restraint device, commonly refered to as a HANS device (although there are several products on the market). The manufacturer of your device may have specific requirements for the angle of the shoulder belts, as they go rearward from the drivers' shoulders. Advanced Autosports is now offering a pre-bent tube, so that you can set the desired belt angle.

With the seat and driver in position, determine what height the HANS bar should be at. Trim the bar as needed and weld in place.

The easiest and most cost effective way to paint the cage is a combination of brush and spray paint. I use rust-o-leum brand. I prefer gloss white or gray. Clean the entire interior with lacquer thinner to remove oils. Starting from the middle of the car and working outward, start painting with a disposable brush. After 15-20 minutes of brushing, overcoat the still tacky brush paint with the spray paint. Since the brush paint is sticky, the spray paint will not bounce and create excessive overspray (it still makes some over spray, but not much). Continue alternating brushing and spraying until the car is done. Anticipate 5-6 hours to do the entire interior.

If possible paint outdoors in sunlight. The paint will dry much faster on a sunny summer day than it will in a cold Wisconsin garage in Decemeber.

White or gray is the most popular color of interior.

While the paint is drying, trim the area forward of the small defroster vents on the dash plastic cover. This will allow clearance for reinstalling the dash. Use care not to trim more than is needed. You should keep the VIN code tag in place if possible.

Trim the dash as close to the bars as possible

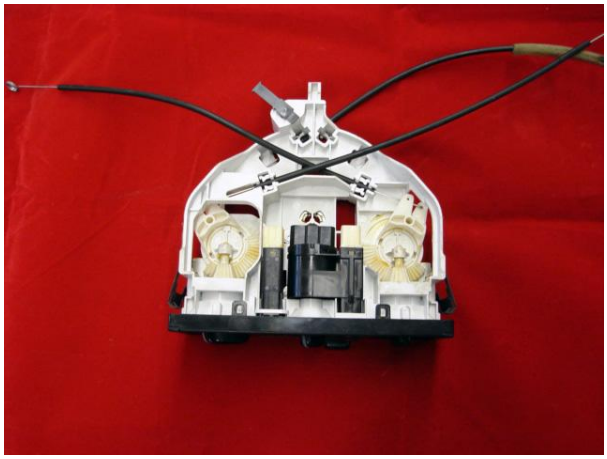
Once the paint is fully dry, you can reinstall the dash panel. You will be able to get about 6 of the Phillips head screws back in. That is enough to hold it in place.

Make sure to reinstall the defroster ducts. The outer A/C vent ducting will be removed. I use duct tape to close any open ducts. This way I get full force out the defroster.

The dead pedal can also be installed now.

The glove box door can be installed if you want the look of an unmodified dash. You will need to remove the "storage" area from the door. The Spec Miata rules allow removing the glove box completely.

You can install the heater control head next. You will need to remove the fresh air door cable and trim the back side of the plastic housing for clearance on the dash bar. The directional door cable and the temp adjust cable are usable.



The A/C heater control head prior to modification

The control head after trimming

Below is a direct copy of the 2014 SCCA General Competition Rules, other groups are similar. It is highly recommended that any area within reach of the drivers head/helmet be covered with SFI approved roll bar padding. Other areas of contact may use standard foam padding. Check with your sanctioning body for the most recent requirements. Generally 3-4 sticks are enough to cover the required areas.

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.

The easiest method to trim roll bar padding is with a loose hack saw blade.

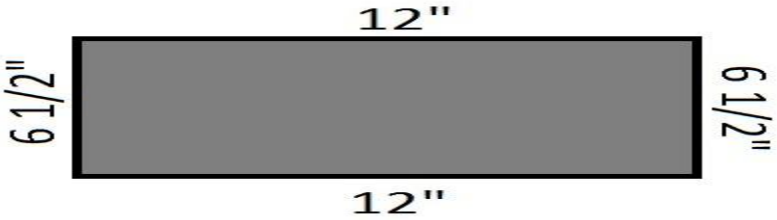
I hope that you enjoy your Spec Miata. With a little patience and some fore-thought you can build a safe and competitive car in your garage. If you do not feel comfortable doing this type of work yourself, please find an experienced fabricator.

If you experience any problems, feel free to call Advanced Autosports at 608-313-1230 or send me an email to Dave@advanced-autosports.com.

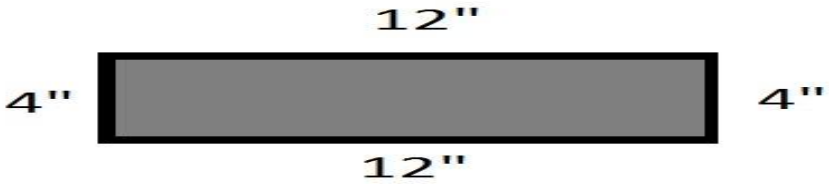
THANK YOU

Dave Wheeler
Remember, Racing is Supposed to be FUN

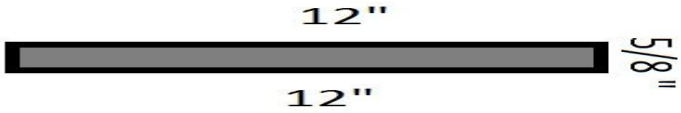
Dimensions for roll cage footing, not drawn to scale. 1/8" thick plate steel is recommended



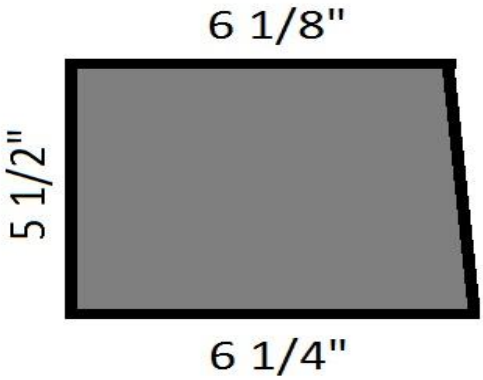
Front cage side, floor
Rectangular
6.5" x 12"
Quantity 2



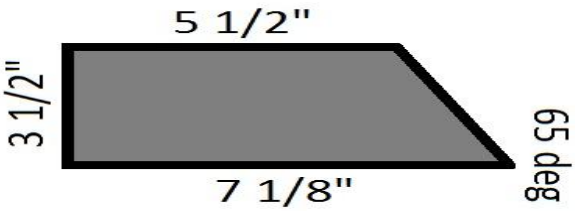
Front cage side, rocker, vertical
And trunk mount
rectangular
4" x 12"
Quantity 4



Front cage side, upper sill
rectangular
0.625" x 12"
Quantity 2



Main Hoop, floor
5.5" x 6.125 x 6.25
Quantity 2



Main Hoop, rocker, vertical
3.5 tall x 7.125" long (lower) x 5.5" (top)
Quantity 2

Main Hoop, rear panel, Vertical
4" tall x 6.38" (top) x 6.625" (lower)
Quantity 2