



Choose an ISP: NetZero High Speed Internet Dial up \$14.95 or NetZero Internet Service \$9.95

[Construction Page](#)[Material List](#)[Contact](#)[Links](#)

# Building a Powdercoat Oven

Powdercoating is an excellent coating system, superior to paint in many ways, and is now available to the hobbyist through the coating guns offered by Eastwood, Columbia Coatings, Harbor Freight, and others. The main deterrent to hobby use, though, is the fact that the coated object has to be baked at temperatures as high as 450 degrees, and for time periods up to 25 minutes, depending on the type of powder used. For smaller objects, an old kitchen oven can be used, but when the size of the object increases beyond that which will fit into a kitchen oven, the equipment cost goes up at a breathtaking rate.

One of my hobbies is restoring and riding old three-wheelers, four-wheelers, and motorcycles. The kitchen oven I have in my shop will barely accomodate a wheel, and a swing arm would be out of the question. I decided to build a powdercoat oven to use in coating objects up to the size of an ATV or motorcycle frame. I wanted the oven to be collapsible so that it could be stored away when not in use. There's not much hard info on the internet about building ovens, but I contacted a few people that had experimented with this sort of thing, then made a few decisions of my own, and forged ahead.

The oven is assembled from a series of panels which is actually 2" rigid fiberglass board wrapped in 28ga sheetmetal. Each panel is different from the others, but all have at least one dimension of 36", which is the largest size that my brake will handle. All fastenings are steel pop rivets, except a few screws which hold the panels together to form the oven. The base is a lightweight frame built up of light gauge metal drywall studs, with burner pans filling in the open areas of the frames.

Heat is provided by 4 salvaged kitchen oven burner elements, of about 3000 watts each. This was the real uncertainty for me, whether the element would heat up the large volume quickly enough. As it turned out, the oven heats up to 450deg in about 10 minutes. Temperature control is provided by a scrounged kitchen oven thermostat which controls a 50 amp definite purpose contactor to turn the elements on and off. The temperature floats a bit but it seems accurate enough.

The total draw of the heating elements is about 12kw. My local power rate is 8.7cents/kwhr, so the oven would cost about \$1.04 per hour to operate.



Here is a front view of the oven. Inside dimensions are 24" wide x 36" high x 72" deep. Two of the four heating elements are visible. The shiny bar across the bottom about 1/2 way into the oven is actually an intermediate support member. It might not be clear from the picture, but the elements are recessed about 1-1/2" below the front lip of the base. A pair of rails, made from small channel iron will be laid the length of the oven and a trolley will be used to carry the

coated object into the interior of the oven.



The trolley is made from 2" angle iron with 4ea fixed casters. If I were to do it over, I would use 1-1/2" angle so that the wheels would protrude at the bottom more. The various rods and pipes that protrude upward are for supporting the items to be coated. Scroll down a little further...





and we have a picture of an ATV frame mounted on the trolley and being loaded into the oven. The rails mentioned earlier are in place and visible in this picture.



Here is a wheel being loaded on the trolley.



A picture of the top of the oven showing the view windows. These windows were salvaged from two scrapped kitchen ovens. The black box on the side of the oven is the interior light, a part also taken directly from the kitchen ovens.

For a closer look at how this oven was constructed, click here to go to the [Construction Page](#).

This site has been viewed **957** times since 4/16/04





Choose an ISP: NetZero High Speed Internet Dial up \$14.95 or NetZero Internet Service \$9.95

[Home](#)[Material List](#)[Contact](#)[Links](#)

## Details of Building the Powdercoat Oven



Before we start the actual construction details, I think discussion of a few tools is in order. The main tool needed is a sheetmetal brake. Here is a picture of my brake, obviously a low budget model (I actually paid \$50 for it at a welding shop). Those of you familiar with this type of brake will notice that the clamping leaf is not stock. Apparently some previous owner had bent the original and fabricated a homemade leaf. This type of brake is slow to use and doesn't (in my opinion) make the sharpest bends, but it is tolerable for the purpose here. Capacity is 36" wide x 18 gauge, but I have my doubts about whether it could handle 18 gauge steel.



A few of the hand tools used for this project. Not shown is a drill for drilling the pop rivets holes. Other than the brake, not many specialty tools were needed. A shear would have saved a lot of time and made squaring the panels a lot easier.



The first step is building the base. The base is constructed from 3-5/8" metal drywall studs, available from building supply houses. The studs were laid on edge and fastened with pop rivets into a frame with two bays. These two bays will have burner pans installed in them to enclose the bottom of the oven.

[Click on this picture to view a larger size.](#)





Each bay of the base has a burner pan as the floor. This pan provide support for the heating elements and prevents heat from escaping from the bottom of the oven. The two outer flanges lay on the base rails and are pop riveted for fastening.



This picture shows a burner pan installed in one of the bays and the heating element being installed.

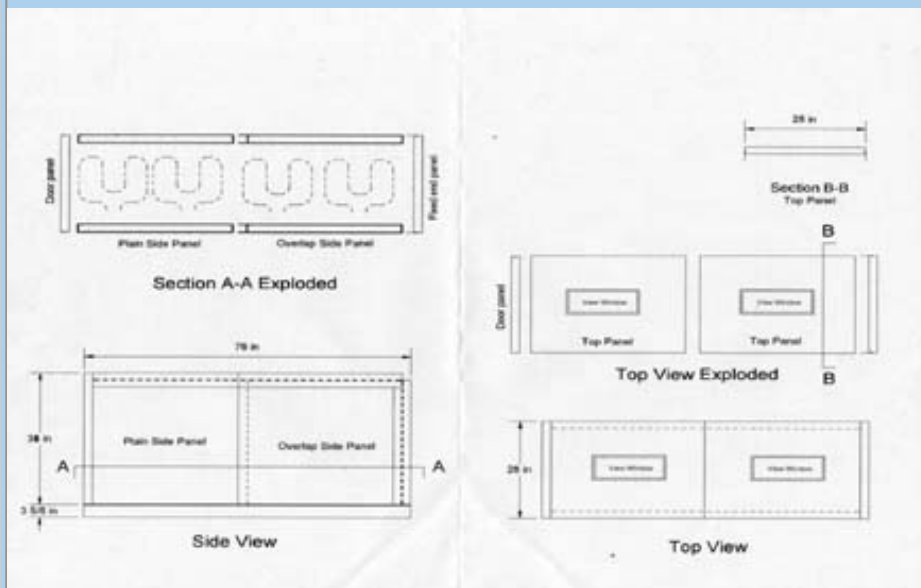


The next step is the construction of the panels that make up the shell of the oven. The panels are made of 28 gauge galvanized sheetmetal wrapped around a core of 2" rigid fiberglass insulation. Typical procedure was to bend a single piece of metal 4 times to form it into a rectangular box, then fill the remaining two open ends with separate fillers. All seams are fastened by pop rivets. This picture shows the brake making the third bend.

This picture shows placement of insulation in a panel. This is not the same



panel as in the previous picture. This panel overlaps the panel adjacent to it and you can see the overlap protruding about 1-1/2" at the bottom of the picture. This panel actually requires three separate fillers to enclose the insulation. The drawing in the next frame will show better how the panels are constructed.

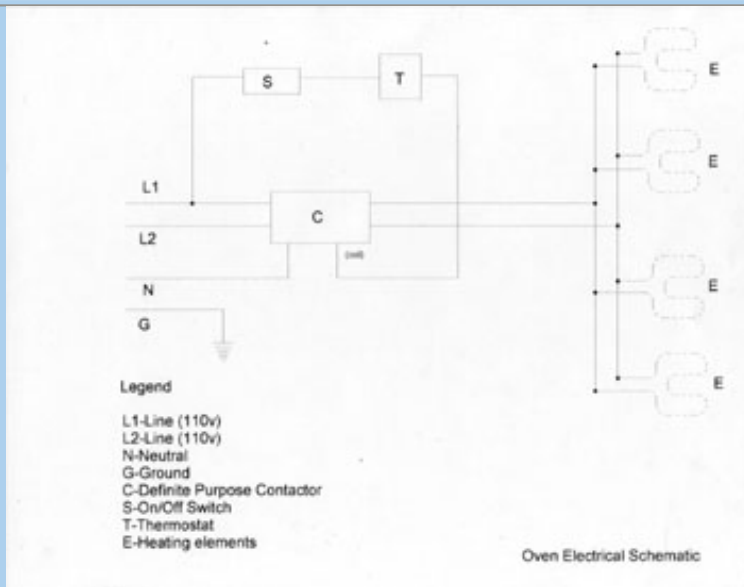


Here is a drawing of the oven. Click on the drawing for a larger view, or [email me](#) to receive a PDF file of this drawing.





The electrical panel shown here was fabricated from the same sheetmetal as the rest of the oven. The two round objects on the bottom of the panel are actually 220v receptacles. Two heating elements are wired together and plug into each of these receptacles. This allows the oven to be disassembled easily for storage.



The schematic to the left shows how the oven is wired. The heart of the electrical system is the contactor, which is an electromagnetic switch. Power (110v) is routed through the ON/OFF switch and is controlled by the thermostat. This circuit activates the coil of the contactor, which closes the 220v circuit that feeds the heating elements. The thermostat causes the contactor cycle open and close to regulate the temperature. The oven has an interior light and switch which I have omitted here for clarity.

Click on the diagram for a larger view.

Construction Page

[Home](#)

## Contact

## Links

# Material List

The following spreadsheet is a list of items I purchased for the construction of the oven. A number of items were already in my scrap bin, including one kitchen oven (I'm a remodeling contractor and frequently haul old appliances to the dump). Another oven was picked up (literally) from the side of the road. The thermostat ,heating elements, and view windows came from these ovens. The steel for the trolley and rails had already been purchased, and was left over from a prior project.

The contactor was purchased from an air conditioning supply house, and in fact, is very similar to the contactor found in the condenser unit of many home A/C units. This contactor has a 50amp capacity with a 110v coil.

[illegible]

292.92



Choose an ISP: NetZero High Speed Internet Dial up \$14.95 or NetZero Internet Service \$9.95

Contact Gary Brady  
in Austin, Texas  
@ [gourdhedd@earthlink.net](mailto:gourdhedd@earthlink.net)

(Please note email address change since your last visit!)

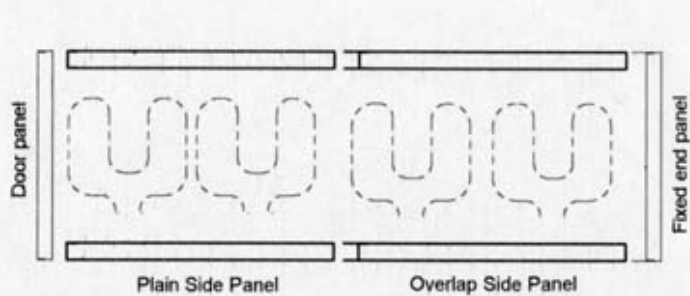




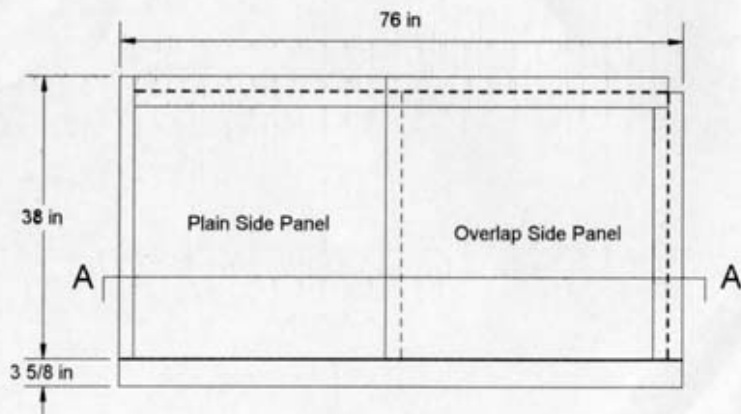
Get a  
**FREE**  
WEBSITE

GO!

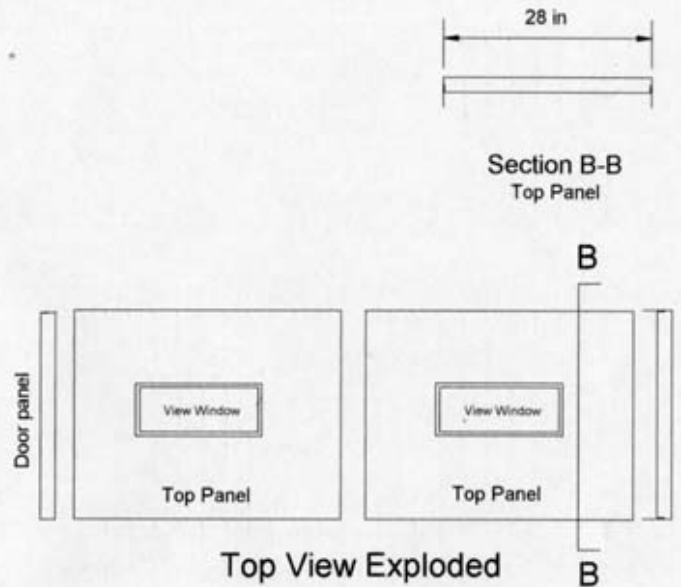
Choose an ISP: NetZero High Speed Internet Dial up \$14.95 or NetZero Internet Service \$9.95



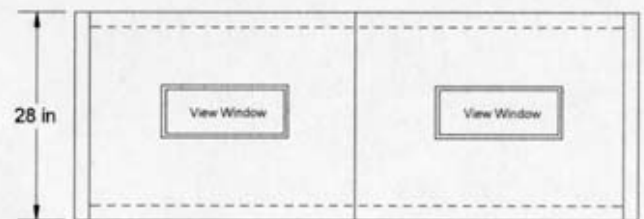
Section A-A Exploded



Side View



Top View Exploded



Top View

