

VACUUM CLEANER POWERED "HOVERCRAFT"

The following is a set of plans for building an inexpensive vehicle which will glide across a smooth floor on a cushion of air. Using only the air output from a standard canister style shop vacuum, it will easily support its own weight and that of a passenger, even if the passenger's weight exceeds 200 lbs. The vehicle is in the shape of a disk of 4 foot diameter, and except for the vacuum cleaner, the parts can be rounded up for under \$20.00. Please pardon the English System units used in this document, but most of the parts are sold that way.

Parts List

- 1 4 ft. by 4 ft piece of 5/8 in. thick plywood. (You will cut a 4 ft. diameter disk from this piece. You may be able to buy a disk already cut at some home improvement stores. They are sometimes sold for making tables.)
- 1 5 ft. by 5 ft. sheet of 6 mil thick (or thicker) plastic sheeting. (This will be cut into a 5 ft. diameter circle.)
- 1 roll of 2 in. wide duct tape. (You will need around 30 yds. of this stuff.)
- 2 2 in. diameter fender washers. (The inside hole should be around 1/4 in. - 3/8 in.)
- 1 1-1/4 in. bolt with a washer and nut. (The bolt should fit your fender washers.)
- 1 approximately 3 in. diameter soft plastic lid. (I used the lid from a can of racquetballs.)
- 1 air source and hose (As mentioned before, a shop vacuum run with the hose connected to the exhaust works well.)

Directions for Construction

1. Cut a 4 ft. diameter disk from the sheet of plywood or particle board. This can be done by driving a nail into the center of a 4 ft. by 4 ft. sheet of material, attaching a cord to the nail and attaching the other end of the cord to a jigsaw in a 2 ft. radius. Drill a 1/4 in. hole through the center of the disk. Cut a hole the same size as the outside diameter of the end of your vacuum hose about 1/3 of the way from the edge of the disk to the center of the disk. (**See Figure 1**) This can be cut with a hole saw or a jigsaw. It is doubtful that you will find a drill bit as large as this hole will be.
2. Sand the edges of the disk to remove any splinters or sharp edges. Alternatively, you could use a router with a roundover bit to smooth the edges. Drill a 1/4 in. hole through the center of the disk. Run the center of a strip of duct tape around the perimeter of the disk. Fold the tape over so that the top and bottom of the disk have a duct tape border running all the way around.
3. Cut a 5 ft diameter circle from the plastic sheet. Carefully cut 8 holes spaced evenly and symmetrically in about a 9 in. radius circle around the center of the plastic. (**See Figure 2**) These holes should be around 1 in. in diameter, and should be cut as smoothly as possible to prevent the tearing of the plastic. Strongly reinforce the center of the circle with duct tape. Using criss-crossing strips, make a duct tape square at least 12 in. by 12 in. The center is where the plastic experiences the most stress This reinforcement is absolutely necessary. I have also found that creating a star (like an asterisk *) with 4 or more 5 foot strips of duct tape that cross at the center of the the plastic circle works well to reinforce the plastic.
4. Secure the center of the center of the plastic to the center of the disk using the bolt, 2 fender washers, plastic lid, washer and nut. (**See Figures 3 and 4**) The plastic lid will help prevent gouging the floor with the bolt in the event of a sudden loss of air.
5. Stretch the plastic so that it is smooth along the bottom of the disk but not too tight. Cut around 16-6 in. strips of duct tape. Start by folding over four edges of the plastic symmetrically around the disk and securing the plastic to the disk with duct tape. Do the same thing in the four sections between your tape strips, half way. You should now have 8 strips spaced symmetrically around the disk. Now fill in the 8 evenly spaced gaps with the 8 remaining strips of tape. Run at least one ring of duct tape all the way around the remaining edge of the plastic to ensure that there are no air leaks.
6. Run another strip of duct tape all the way around the edge of the disk. This strip will be attached to the plastic. Fold it so that there is an equal amount of tape on the top and bottom of the disk. This strip will serve as protection for the plastic in case of the inevitable collisions with desks, tables and walls.
7. Set the vacuum cleaner on the top of the disk and run the hose from the exhaust of the vacuum to the hole in the disk. It is helpful to attach the vacuum to a variac transformer so that you can feed the air in gradually at first. When you first turn on the vacuum is when the plastic secured in the center is most likely to tear. This should not be a problem if you do a good job of reinforcing the plastic in the center. (**See Figure 5**). Your hovercraft should slide freely on a smooth floor, even with loads in excess of 200 lbs.