



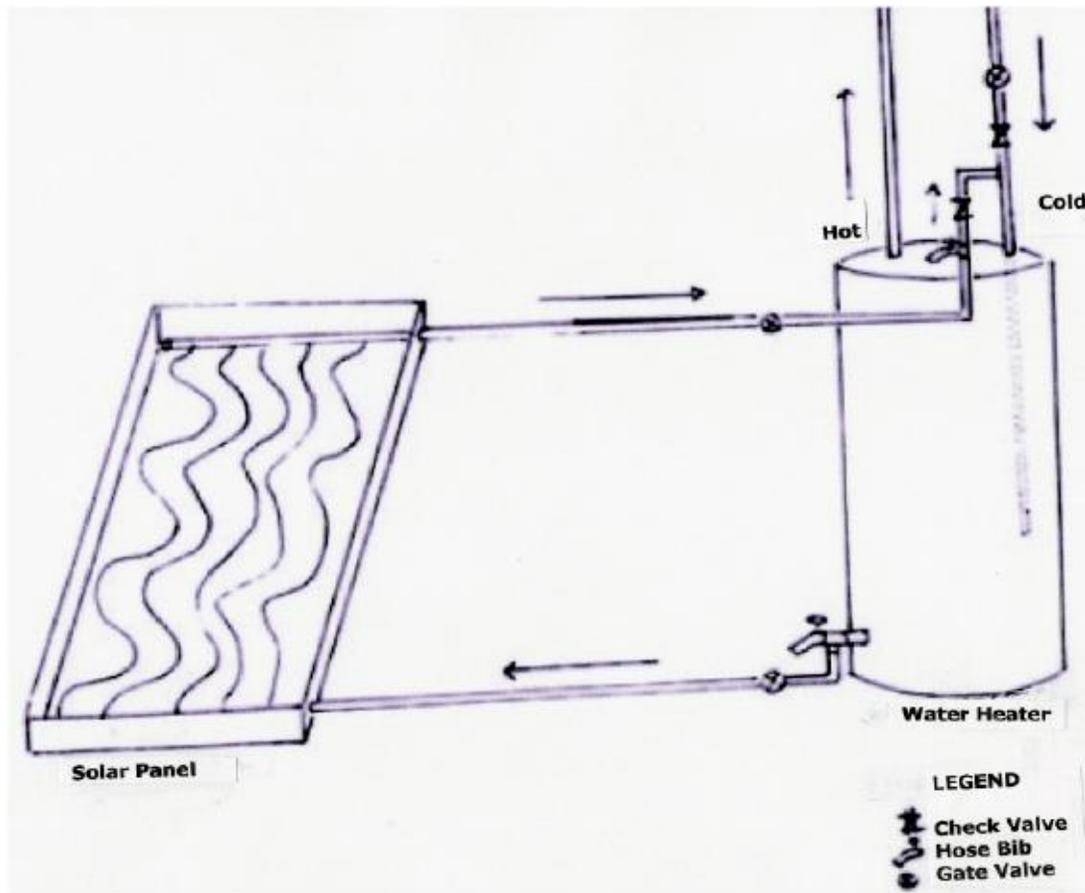
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Parts List for your Solar Water Heater

- One 4' x 8' sheet of 5/8 CDX
- Galvanized screws – 1.5 inch and 3 inch
- One 4' x 8' sheet, 1/2 inch Styrofoam insulation
- Two 2' x 8' sheets, corrugated sheet metal
- One or two cans of black spray paint
- 10' of 1 inch copper pipe (M or L)
- 100' roll of 3/8" copper tube
- 3/8" drill bit
- Sliding glass door, single pane (check craigslist or garage sale)
- Two 2" x 4" x 8'
- Two 2" x 4" x 10'
- Torch
- Silver solder (or 95/5)

Here's what your system will look like:



Building the Panel

1. Start with the 4' x 8' sheet of plywood or weather resistant chip board.
2. Build a frame around the plywood sheet using the 1x4 or 2x4, whichever is available and/or less expensive.
3. Use scrap 2x4 for the legs to prop the panel up at an approximate 45 degree angle. The best angle for your panel will depend upon your latitude and the time of year. You may have to make adjustments to get the optimum angle.
4. Install the insulation.
5. Insert the two 2x8 sheets of corrugated sheet metal.
6. Paint the sheet metal black.
7. Plumbing the panel: use either $\frac{3}{4}$ " or 1" copper L or M tube for the manifolds. Drill $\frac{3}{8}$ " hole at every 8", five times on both the top and bottom tubes for the $\frac{3}{8}$ " copper tube.
8. For the $\frac{3}{8}$ " tube: bend your tube into a zig zag pattern, approximately every 6 inches. A $\frac{3}{8}$ " tube bender will help with this. The simple spring type will work. They are inexpensive and easy to find at your local hardware store.
9. Once all the tubes are bent, find a large, flat work space and assemble.
10. Insert the $\frac{3}{8}$ tubes into the manifold, all five of them.
11. Now solder. The best one to use is Silver Flow Solder. If you're not comfortable silver soldering, you can use 95/5 solder.
12. Test for leaks. Cap one end and fit a hose adapter fitting to the other, fill it with water to pressure, and test for leaks.
13. Fix any leaks.
14. Fit plumbing into box. Cut notches into the frame for the manifolds to fit.
15. Paint plumbing black.
16. Set panel up with legs.

17. Installing plumbing into water heater: Run $\frac{3}{4}$ " water piping from the bottom of the water heater to the bottom of the panel. Run another line from the top of the panel to the top of the water heater (refer to diagram).
18. Install piping with a $\frac{1}{4}$ " grade from water heater to panel.
19. Insulate both lines with $\frac{3}{4}$ " wall insulation. Don't forget to install $\frac{3}{4}$ " isolation valves on both lines and a drain valve at the bottom of the panel. If you live in an area that freezes, isolate and drain the panel before the winter frost sets in.
20. Install glass panel over solar panel.
21. Hook up hose to hot side hose bib to start thermal siphon and purge all the air. If you are getting hot water on the hot return – GREAT! If you are not, purge the line again. It sometimes can take a bit to get the siphon to work. Also, check to make sure there are no bellies or low spots in either your supply or return lines. That can stop the flow of water. Once the thermal siphon starts, you're done!

GREAT JOB!