Construction of the Clarifier

The following materials are needed:

1. Kalwall (Sun-Lite Sheeting)
   Sun-Lite, 0.040” (4 mil) 4’ by 50’ roll. (Makes 2 clarifiers)
   Solar components Corp
   P.O. Box 237
   Manchester, NH 03105
   603-668-8186

2. Galvanized hoop steel
   30 ft (5 lb.) ¼” diameter
   2 couplings, 3”
   Nylon Net Co.
   7 Vance Ave.
   P.O. Box 592
   Memphis, TN 38101
   1-800-238-6680

3. Plastic transfer funnel, 11” top diameter Cat. No J-25078
   Markson Science
   7815 46th St.
   Phoenix, AZ
   1-800-

4. Epoxy glue, 2 part, 1 gallon

5. Sand, gravel and cement for 4-ft3 of concrete

6. Plywood, ¾”, for form 15” x 15” x 15’

7. fiberglass mat strips, 4” wide

8. fiberglass mat, 3 ft2, heavy

9. fiberglass resin, ½ gallon

10. corrugated fiberglass sheet, 8’ x 26”

11. Corrugated wood strips, 16’
12. Nails, 1” wire nail ¼ lb.
13. Industrial enamel paint, black ½ gallon; white, ½ gallon
14. Plexiglas plate, 1.5’ x 2’ x 3/16”
15. silicon caulk, 2 tubes
16. PVC pipe, 1 ¼”, 10’
17. PVC elbows, 1 ¼”, 90°, 3
18. PVC elbows, 1 ¼”, 45°, 2
19. PVC ball valve, 1 ¼”
20. PVC male adapter, 3”, 2
21. PVC female adapter, 3”, 2
22. PCV cement, 1 quart

The cylindrical and conical sections of the clarifier are constructed separately and then joined. The diameter of the cylindrical section is approximately 3.85 ft. A 12’ 3” section of Kalwall is cut and formed into a cylinder with a 2” overlap. The overlap section should be lightly sanded on both opposing surfaces and then fused together with fiberglass resin. This should be done with the seam located on a flat surface and weighted down from above with a board and concrete blocks on top of the seam to create pressure for a good seal. After this has dried, a 4” strip of fiberglass mat (lightweight) is attached with resin to both sides of the seam for reinforcement.

Two hoops are fashioned from the hoop steel with the aid of couplings and epoxy glue. The hoops should fit snugly over the outside of the cylinder. They are then fastened to the top and bottom edge of the cylinder with epoxy glue. Strips of fiberglass mat are then fastened with resin to the inside and outside edges at the top and bottom of the cylinder for additional strength.

The conical section is made by cutting a semi-circle, 8’ in diameter, out of the Kalwall. A small semi-circle with a diameter of about 10” is cut out of the middle of the large semi-circle as shown below.
opposing surfaces of edges A and B, the large semicircle is folded into a cone so that edges A and B overlap by 2”. The are fastened together with resin and reinforced with fiberglass mat in the same manner that the cylinder was formed.

The area above the apex of the cone needs to be strengthened. This is done by attaching a piece of thick fiberglass mat to the outside of the cone with resin. The mat should extend a distance of at least 1-ft up the side of the cone. Joints in the mat covering should fit together tightly to create a smooth surface.

The cone is attached to the cylinder by first supporting the cone in an up right position. This is done by placing the apex of the cone in a large garbage container. The top diameter of the cone is slightly larger than the diameter of the cylinder. The cylinder is placed in the cone and leveled with respect to the cone. The small gap between the cone and the cylinder is filled with epoxy glue. After the glue hardens, the clarifier is placed on its side and fiberglass strips are fastened with resin to the inside seam between the cone and the cylinder.

The baffle is made by cutting 2 sections of corrugated fiberglass to a length of 3.85’, the diameter of the clarifier. The corrugations of the 2 sections are overlapped slightly to form a combined height of 4’ in length. The sections are painted with a good coat of white industrial enamel. Sets of 2 sections are then nailed together with the edge of the corrugated fiberglass between them. The fiberglass overlap seam is sealed with silicon caulk. The baffle is then inserted into the clarifier. When it is in place, it is nailed to the wall of the clarifier from the outside and the nail holes are sealed from the outside with epoxy glue. The seam between the baffle and the clarifier wall is sealed with silicon caulk.

The inlets and outlets are made by cutting holes with a hole saw sized for the male threaded end of the 3” PVC adapter coupling. The centers of the holes are located 6” from the top of the clarifier to allow for a 6’ freeboard in the rearing tank. Threaded male and female adapters are then connected through the holes. The seams are patched with silicon caulk.

The clarifier is supported by a concrete pedestal. It consists of a square block of concrete about 15” on each side. After the form is made from plywood 1 ½” hole is cut through the side for the insertion of a 1 ¼” drainpipe. The drainpipe ends with a 90° elbow. Connected to the elbow is a short section of pipe that is attached to a 45° elbow. A 2’9” section of pipe is connected to this elbow and extends through the hole in the form. The stem of the plastic funnel is cut off and its apex is placed in the 90° elbow of the drainpipe, which is centered in the form a few inches off the bottom. It can be supported initially with wires but as concrete is poured in the bottom of the form it will support the drainpipe and the wires can be removed. The form is then carefully filled with concrete with the funnel in place. After drying, the funnel and plywood are removed.
A conical shaped hole is dug in the ground with a squared out section at the bottom for the pedestal. An area is dug out on one side of the hole to create space for the drainpipe. The pedestal is lowered into the hole with a rope sling supported by a board that is carried by 2 people. The pedestal must be placed level in the bottom of the hole. The vertical section of the drainpipe is installed at this point. A piece of cloth is placed into the drain and then one tube of clear silicon caulk is spread evenly on the inside of the concrete cone. Very quickly, the clarifier is lowered into place. After leveling it, concrete blocks are placed on boards over the clarifier top. This creates pressure to make a good seal between the concrete cone and the clarifier. After the silicon is dry, small sized gravel is back-filled into the space between the ground and the clarifier cone. Someone must carefully go into the clarifier to remove the cloth from the drainpipe and cut off the silicon that oozed out from the seam between the concrete and Kalwall.

The clarifier is painted to prevent sunlight from promoting algae growth. It is painted black with industrial enamel and then covered with one or two coats of white enamel. The ball valve and the inlet and outlet pipes are installed and the clarifier is now ready for action.