



INSTALLATION MANUAL FOR 42 ft GROWING DOME®

Congratulations, you have just acquired the most useful and fun project since the invention of the wheel. Your Growing Dome® will provide you with endless hours of discovery, creative experimentation, innovative possibilities as well as lots of succulent fresh vegetables, fruit and flowers if you wish, all year round.

The integrated design features, low impact technology, state of the art heating and cooling systems combine to make your backyard Growing Dome® the talk of the neighborhood. We provide you with a complete Growing Dome® basic kit which you can improve upon endlessly according to your environment and your needs, your whim and pocket book. People have installed in their domes: hot tubs, aquatic systems, waterfalls and fountains, many types of heating and cooling systems, hanging chairs and hammocks meditation areas as well as spaces for sitting, dining, or just being.

OVERVIEW OF THE GROWING DOME®

Essentially the Growing Dome® is a solar-heated greenhouse designed for year-round growing, which contains large amounts of thermal mass - for example a water tank, plus the soil mass, to absorb the heat of the sun. The use of double or triple-walled insulation glazing panels, under-soil insulation and north wall insulation delay the loss of contained heat.

The thermal mass helps to stabilize the temperature, keeping the dome cool in the summer and warm in the winter. The amount of heat captured in the day is increased by the use of under-soil ducts through which hot air is blown and can be further increased by the use of heat exchangers and auxiliary solar panels. One is only limited by ingenuity and funds.

The temperature difference that we have found between the inside and the outside is that a twin wall dome will stand up to 20 degrees of frost without freezing inside and the premium 25 to 28 degrees.

In the winter the water tank temperature is anywhere between 45 to 60 degrees and in the summer between 65 and 80 degrees.

In the winter as the tank gives off the heat captured in the day into the dome structure, the amount of heat and Btu's that it released is equivalent to running a 1500-watt ceramic heater for 5 hours.

THE KIT

Your Growing Dome® kit essentially consists of the following:

- The structural units with connecting hardware
- The outer covering (glazing & tape)
- An insulated entry door
- North wall insulation panels
- Vents (opening windows) complete with automatic openers
- 4 thermostatically controlled cooling fans
- 2 Under-soil heating fans, solar panels & distribution boxes
- Hardware plus liner for making your own water tank(s)

The parts you provide as detailed on separate sheet are as follows:

- Perimeter under-soil insulation & foundation wall insulation
- Ducts for under-soil heating system
- Water tank (sheet metal) & support lumber (or other thermal mass)
- Lumber for behind water tank
- Doorway return foundation slab
- Gravel, soil and sand
- Enthusiasm & commitment

INSTALLING YOUR GROWING DOME®

SELECTING A SITE

You may want to check to see if there are any restrictions on greenhouses in your area -local subdivision, county or city. Planning and zoning departments may be consulted on this matter. Also, neighbors may be informed and, hopefully, will support and even benefit from your excess produce.

Usually the dome can be classified as a temporary structure, as it bolts together and unbolts if you choose and does not need a concrete foundation. Here are some factors to consider when choosing your site for the dome:

1. Solar horizon - Preferably unrestricted to the south, east and west - in that order of preference. You can approach a solar architect in your area if you have questions or need advice. A solar pathfinder is a useful tool to borrow. If you have a lot of sun in the summer this may cause overheating problems. Deciduous trees may be helpful as they lose their leaves allowing solar gain in the winter. If you have to choose between morning sun and afternoon sun, the plants prefer the morning sun to get them off to an early start. The dome site needs to have a minimum of 4 to 5 hours of clear sun for the dome to perform effectively. If it has less than this, the dome will still perform but you need perhaps to add auxiliary heat in the winter months.

2. Proximity to dwelling - If the dome is fairly close to the house it's easier to pop into it to pick dome-fresh greens or a few herbs for your salad or stir-fry. Also, it's closer to shovel a pathway through the snow and also to power and water!

3. Shelter - Having trees to give some shelter from the wind is useful in order to reduce heat loss in the winter, and also reduce stress on the vents during high winds.

4. Soil - It is preferable to start with a level site. Otherwise, use a slope to the south. The site needs to be leveled, and usually owners choose to excavate the high side in combination with building up the low side often using a retaining wall made of landscape timbers or rocks. If your soil is poor and rocky you may choose to excavate down a foot or two, remove the poor soil and bring in good topsoil, or build up on top of the existing soil. It is strongly advised to remove all perennial weed at this juncture, as removing them later is a proverbial pain. Many dome owners have regretted omitting this step (including myself). Also remove creeping weeds with underground rhizomes to a distance of a couple of feet away from the dome, as they can creep under the wall and right through the insulation! If you have gophers or burrowing animals, you may want to bury some galvanized sheet metal or hardware screen along with the underground insulation. Usually to a depth of two feet is sufficient.

SERVICES

At this stage people can install electricity and water supply, although these are not necessary for the dome to function and can be added later if you choose. Some owners use polyethylene water pipe, which can freeze and thaw without rupturing. Plants in the dome can also be watered directly from the water tank during wintertime, as water demands are usually low and the tank can be topped off once a month or so. In the summer the dome can be hand-watered, using a hose, or a sprinkler system. Propane heat can also be used for an auxiliary heat supply for those sub-zero winter nights and is preferred by most Dome Owners Electric heat is helpful, but expensive. Although the Growing Dome® is usually designed to require no electricity, the 33 ft and 42 ft domes do need it for the cooling fans. The 42 ft Dome has a solar powered cooling fan option, and more fans can be provided for hotter climates for an extra cost.

Growing Spaces® can give you personal advice on your particular location and we are more than happy to consult with you on any aspect of installing or maintaining your Growing Dome®.

TOOLS YOU WILL NEED (Unless Growing Spaces® is installing your Dome)*

Cordless screw gun with reverse function - preferably two guns
Electric drill - preferably two drills
Twist drill set from 1/8" to 5/16"
Magnetic bit holder for Phillips #1 AND #2 drives
Hammers - claw hammer, heavy hammer
Metal shears
Stanley knife
Stapler
Scissors
Small roller
Alcohol and clean rags
Transit or builders level and 4-foot level
Wire - or non-stretching string
Rebar stakes or 2X wooden surveyors stakes
Tape measure
Handsaw
Felt marking pen - thin line
Shovel
7/16", 1/2" socket wrench and 9/16" deep socket
Adjustable wrench
Utility knife

*Provided by owner even in Growing Spaces® Installations

Ladders:

42-foot dome - 2 6-foot stepladders
2 8-foot stepladders
2 14-foot ladders (extension)
2 6-foot scaffold sections

CAUTION!!

Gloves should be worn when handling glazing and metal pieces.

THE DETAILED INSTRUCTIONS ON INSTALLING YOUR DOME

SITE PREPARATION FOR YOUR DOME

Begin by marking a circle 3 feet larger than the dome size, i.e. 45-foot diameter in case of the 42-foot dome. Put in a center peg, which can be a wooden stake with a nail in the top or a Rebar stake. From the center peg mark the radius string of half the diameter of the area you need to clear, and mark the circumference with stakes. These can be Rebar stakes or wooden surveyors stakes. Clear this area of turf and level it. **It is important to have the site within two to three inches of level** and this needs to be verified with an accurate measuring instrument such as a transit or builder's level, or a 4' level attached to a straight piece of wood the length of the dome radius. If the site is sloping, some excavation and build up may be required. People have used railway ties or a rock wall if the lower area needs to be built up. Poor soil, rocks and perennial weed must be removed if you choose to build-up the area with topsoil. You can dig a trench to install this later. Helpful Hint: If time permits cover the area with black or clear plastic for 1 to 2 month prior to beginning. This will help to kill the weeds in this area without dangerous chemicals.

Now, prepare to mark out the dome foundation itself. The 42-foot dome has 20 sides and 20 points. From the center peg stretch the radius wire, to the northerly point of the dome. We generally have a flat E section to the north.

The radius wire for the 42-ft dome is 20-feet 4-3/4 inches and the strut wires are

B - 5 feet 6-1/2 inches

C - 6 feet 6-3/4 inches

E - 6 feet 11-1/4 inches

Insert wooden stake at one side of the north E flat section, put a nail or screw in the stake, and loop the wire over this. Make sure that the length of the wire takes into account the diameter of the center peg if this is Rebar, as the measurement is taken from actual center of the peg, and 1/2 inch error in the radius wire can lead to an 8-inch error at the circumference. Do not be overly upset if it does not come out exact the first time. It is important to understand that when you are doing the layout, the points that you are measuring to are the outside points of the wall of the dome.

Next, remove the radius wire from the first peg but keep it on the center peg. Loop the E strut wire) over the first peg and stretch it out. Where the radius wire and the strut wire meet is the next point of the dome. Put in another wooden stake at this point and put a nail or screw in the top so that both wires are stretched tight as they loop over this nail. Continue to mark out the succeeding points using the strings in the order, E, C, B, C E, etc until you reach the half way point which will be a B flat section.

THE 42-FOOT DOME

- * Continue around until you reach the 11th peg.
- * Mark the center of the strut wire as it stretches between the 10th and 11th peg, which should be directly opposite the first E section to the north.
- * Stretch a line from the exact center of the north through the center point so that it intersects the strut wire.
- * If it cuts this strut string in half exactly, you are right on. Continue to the north point.
- * If the layout doesn't reach the expected position, then either:
 - (1) The radius wire is too long or
 - (2) The strut wire is too short.
- * Divide the error in inches by 5 to get a length, which we call the adjustment length, which you add to or subtract from the C strut wire.
- * If the layout is too short, (i.e. the pegs are not as far as they should be) add the adjustment length to the strut wire.
- * If the layout is too long, subtract the adjustment length from the strut wire.
- * Go back and readjust the pegs already installed until you arrive at the correct layout.
- * Continue to the north E section with this readjusted strut wire length.

Congratulations you have just successfully laid out your dome foundation!

INSTALLING UNDER-SOIL INSULATION

Before reading this, read the piece on foundation options.

There are 2 options when installing the under soil insulation. The first option is to use insulated concrete forms or put insulation on the outside of the concrete after you have poured the foundation if you use plywood forms. The second is to install the 2" blue board horizontally after the dome is constructed and cover it with gravel. Both these options prevent frost from creeping under the wall of the dome. Option one is more effective but is a lot more work and can seriously undermine the integrity of the load bearing soil, whereas option 2 is easier but not quite as powerful a frost barrier.

Option 1

You will have to remove the layout pegs as you excavate, but you still need to know where these points are. The best way to do this is to insert another ring of pegs exactly ten feet outside the layout pegs and extend the radius string by ten feet. Now when you install the forms it is still possible to locate exactly where the intersecting points of the foundation should be.

Option 2

If you are choosing this option the ground preparation is simpler. The insulation is installed after the dome is finished.

19 pieces of blue board are cut with a 9 degree angle on each end, so that each piece measures 1' 4" x 6' 7" for the C sections at the short side (see diagram); 5' 6-1/2" for the B sections; and 6' 11" for the E sections.

These are installed by removing the dirt to a depth of 2" next to the wall of the dome, sloping to 4" depth 1' 4" away from the dome wall. The end result is like a "skirt" which is covered with gravel for 3" next to the dome wall (so that rain does not cause dirt to splash up) and soil further out.

INSTALLING THE LOW COST FOUNDATION

When you install the gravel base for the dome foundation to sit on, you will have to remove the layout pegs, but you still need to know where these points are. The best way to do this is to insert another ring of pegs exactly two or three feet outside the layout pegs and extend the radius string by this amount. Now when you install the gravel base it is still possible to locate exactly where the intersecting points of the foundation wall should be.

Excavate a 3" deep, level trench, which conforms to the layout you have created. The trench needs to be 6" wide (minimum) with its outer edge on a line between the rings of pegs. Fill this trench with $\frac{3}{4}$ " washed gravel and compact the gravel so it is level. It is best to use a transit or builder's level at this stage, as it is important that the ground be level for the foundation wall to sit correctly. The foundation wall sections are placed in a circle on top of the ring of level compacted gravel. Where the outer points meet is at the points of the layout initially created.

DOMES CONSTRUCTION FOR THE 4 FREQUENCY 42-FOOT DOME

The first thing to do is to assemble the paper model. This will be helpful in orientating your dome on the site and also will give you an idea of the structure, location of door, vents, and north wall insulation. Simply tape together the 5 cutouts along their edge, gather the gusset sections together, and tape them. Assemble the model with the numbers 1 through 5 in a counter clockwise direction. It can be helpful to score the lines with the back of a knife to make it easier to bend the panels.

Your dome model is now a guide showing how your finished dome will look. It is good to have the model on your site to refer to when assembling the dome. Also, it is good to have your assistants study the video before working on the dome.

THE FOUNDATION WALL

The dome wall kit, consists of the following:

5 "B" sections:

5 top plates, linseed oiled lumber 2" x 6" "

5 bottom plates, linseed oiled lumber, recycled plastic, or redwood

10 "C" sections:

10 top plates, oil treated 2" x 6"

10 bottom plates of linseed oiled lumber, recycled plastic, or redwood

5 "E" sections:

5 top plates, linseed oiled lumber 2" x 6" "

5 bottom plates of linseed oiled lumber, recycled plastic, or redwood

All plates have a 9-degree angle cut on each end (see diagram)

Other sections:

61 upright studs {2" x 6" x 1' 1"}

10 "C" pieces T1-11 exterior plywood

4 "B" pieces T1-11 exterior plywood

5 "E" pieces T1-11 exterior plywood

2 door return 33" x 1'4" T1-11

2 short pieces T1-11 exterior plywood {15-1/2" x 1' 4"}

60 3-1/2" x 5/16" carriage bolts, nuts and washers

400 16-penny nails

400 1-5/8" deck screws

19 horizontal trim strips

4 doorway trim strips

40 vertical trim strips 1-1/2" x 1' 4-3/4" (with 9 degree bevel on one edge)

ASSEMBLING THE WALL SECTIONS

You will need:

- 10 "C" sections
- 5 "E" sections
- 4 "B" sections
- 1 door section

Attach one upright stud at each end of the top plate and one at the center. Holes are pre-drilled to nail through. Make sure the outer edge of the stud is parallel with the angle on the plate and the inner corner is projecting, not the outer corner. When building the wall sections, make absolutely sure that the end stud is flush with the cut end of the top and bottom plates as if it projects this alters the radius of the dome foundation and thus alters the way the dome sits on the foundation making it potentially difficult to fit the trim strips at a later time.

Turn the plate over and attach the bottom plate so that you have a structure as shown in diagram. Lay it flat and screw the exterior plywood on to the long side (the outside). Make sure the wall section is square by attaching one end of the plywood with 4 deck screws, then keeping one side of the plywood flush with the edge of the wall frame, screw the other end with 4 screws. Finish by fixing 4 screws in the center stud and 8 extra screws spaced equally on each edge.

The doorway section has 2 center studs (where marked) and two short pieces of exterior plywood. Fix the door studs to the marks shown, the inside of the studs are 39" apart. There are 4 studs used in this door section of the foundation wall. The inner studs mark the outside of the door opening and the two short plywood pieces are screwed on with their inner edges level with the inner edges of the studs (39" opening).

Now it is time to attach the wall sections on the gravel foundation. Start at the north point of the dome by putting 2 "C" sections together on either side of this point. The wall sections are fixed in the order "C" "E" "C" "B" "C" "E" "C" "B", etc., all the way round the dome. The doorway always goes through a "B" section, so you have 3 choices for its location, as the northerly 2 "B" sections are where the tank goes.

Match the joints of the wall with the line from the center peg to the 20 stakes marking the dome layout. You may need to lean the pegs out to place the wall sections, but be sure that the line of intersection does not stray more than a couple of inches from the layout points. Bolt the wall sections together through the end studs with 3 @ 5/16" by 3-1/2" carriage bolts provided. Have your friend hold the wall sections with the tops level and the inner edges flush while you drill three 5/16" holes. Insert bolts through the holes, put washers under the nuts and tighten snugly. It is important when fixing the wall sections together that the tops be level and aligned within 1/8th of an inch and if the tops of the wall accurately come together, if the wall section is buckled or warped in anyway and the bottom does not quite line up, this is not a problem.

When you have tightened all the bolts, make sure the wall section is evenly supported by fine gravel which is firmly compacted. Check the radius string to make sure the wall is perfectly circular. Make sure the radius string is horizontal as you check, or you will get a false reading. Small variations to 1/4" are acceptable for the dome structure is fairly forgiving.

Cut the 2" insulation blue board or R-19 fiberglass batt into 20 " C" pieces 12-3/4" by 3 ft" plus 8 "B" pieces 12-3/4" by 2 ft 6", 20" E" pieces 12-3/4" by 3ft 2-1/2" and install into the spaces between the studs. Now cover the inside of the wall with the galvanized sheet metal provided, using stainless sheet metal screws provided. If you are using fiberglass it is best to glue or caulk the sheet metal to prevent entry of moisture into the wall cavity.

When using galvanized sheet metal, make sure the metal is truly horizontal before screwing. The sheet metal will either be level with the top of the wall or stick up about two inches above the top plate of the wall. In this case, make a cut at each of the apex's and bend the top of the metal over using a piece of wood to obtain an accurate crease and screw using a 1/4" hex driver bit.

THE DOME STRUCTURE

The next step is to assemble the struts of the dome structure. There are:

25 "A" struts (red)

30 "B" struts (blue)

50 "C" struts (green)

20 "E" struts (yellow)

20 "F" struts (brown)

40 "D" struts (purple)

The hubs are in 2 sets

7-1/2" diameter and fit on the inside of the dome structure

9-1/2" diameter and fit on the outside of the dome structure

Each set has

5 pentagon hubs (with five holes)

45 hexagon hubs (with six holes)

20 half hubs (with four holes)

We assemble the dome in sub- units as follows:

5 Pentagons

5 EDCC Half-stars on a half hub

5 CCD Half-stars on a half hub

5 FF on a full hub

5 EDCC Half-stars on a full hub

5 CCD Half-stars on a full hub

5 DFD Tripods " "

5 DEED half stars " "

5 CFC tripods " "

Before putting the dome together, it is helpful to seat the bolts into the holes in the outer hub with a sharp tap with a hammer, so they do not rotate when you tighten them.

Before creating the units of the dome structure it is good to take the 5 B struts and the 10 C struts and 5 E struts with the largest knots in them and save these to use as base struts i.e. they will be the struts that actually sit on the foundation wall and are connected to the base hubs (1/2 hubs)

THE PENTAGONS

These have 5 "B" struts and 5 "A" struts. The "B" struts are longer and have their ends colored blue. The "A" struts have red ends and are the shortest strut in the dome.

The hubs are aluminum and are dish-shaped. The hubs go on the inside and outside of the dome structure and have 1/2" holes. Each pentagon has the following pairs of hubs:
1 pentagon hub, 3 full hexagon hubs and 2 half-hubs.

Take 5 "A" struts and place them so that one end of each meet in a five pointed star arrangement. Attach an inner and an outer pentagon hub at the center of the pentagon where all 5 A struts come together. Put the nut on the bolt and tighten slightly.

Take 5 "B" struts and place them around the "A" struts so that they form a pentagon shape. On one of the base "B" struts, (choosing struts that have the largest knots in them to be the base struts as these are fastened to the wall plates and are not load bearing), fit a half-hub set on each end so the hub edges are level with the same edge of the strut. These hubs will eventually be sitting flat on the foundation wall. The other three corners of the pentagon have full hexagon hubs.

Insert the bolts through the holes in the hubs and put nuts on. Make sure the struts are correctly aligned before firmly tightening the nuts. The correct alignment is when an imaginary line going down the center of each strut will pass through the hole in the center of each hub (see diagram). When the correct alignment is achieved, tighten down the bolts firmly.

You now have one completed pentagon structure. Repeat the process four more times to complete 5 pentagons necessary for the dome structure. One of these pentagons will be used for the doorway, and the five "A" struts will be removed and used as the last 5 struts at the very top of the dome when completing the dome structure. The final pentagon is referred to as the doorway pentagon.

THE "CCDE" HALF STAR

This structure consists of 1 "E" struts 1 D strut and 2 "C" struts marked "Base" joined together onto a half hub. Assemble so that the E and "C" struts form a straight line and the D and C struts are in between them. Tighten as firmly as possible in the correct hub alignment. Assemble 5 of these.

The rest of the units are as per the diagram

ASSEMBLING THE DOME STRUCTURE

Start putting the dome together by standing the doorway pentagon on the door section of the foundation wall. The "B" strut with the 2 half-hubs on each end is the one that actually sits on the wall. Have two assistants for this part of the procedure, one person holding this pentagon and the other person holding a "CCDE" half-star next to it. Connect the "C" strut of the half-star to the corner of the pentagon and the "C" and E struts sitting on the wall to the half-hub of the pentagon. You will have to lean the structures inward to make these connections.

Have the struts sitting on the wall so that the edge of the strut overlaps the wall slightly *and the center hole in the hub always lines up with the joining line between wall sections.*

Screw the dome to the foundation wall, temporarily using two 3" deck screws per section. Now connect another pentagon to the other side of the "CCD" half-star, again connecting the "C" strut to the corner of the pentagon and the other "C" strut to the bottom half hub of the pentagon. Use a FF to connect the upper ends of the "D" struts together. This will also connect the pentagons together. Continue all around the dome alternately using a pentagon, then an "EDCC" half-star, a DCC half star then a "FF" straight, until you have completed the first layer of the dome.

Screw the dome structure to the foundation wall by screwing through the struts, which rest on the wall, initially using two 3" deck screws per section, then eventually the 4" carriage bolts provided. Make sure that the struts are level with the outside of the wall plates, and that the joining angles of the foundation wall line up with the hub center hole. If this is done accurately it will expedite the fitting of the trim strips later. You can move the wall in or out slightly and this can help the dome to fit more accurately.

THE SECOND LAYER

Ladders are needed to assemble this layer of the dome. This level consists of 5 "CCD" half-stars on full hubs and 5 EDCC half stars on full hubs.

It is easier to look at the dome diagram than for the instructions to be written.

Fix firmly and snug the nuts as you go, making sure that the struts and hubs are in correct alignment. Rotated hubs will make fitting the glazing difficult later on. It is important not to stand on the structure until all the bolts are tight, and after the structure is completed, it is important to go around and tighten down the bolts very firmly in the hubs.

You must be very careful to make sure the hubs are lined up properly as any rotation of the hub will make the glazing not fit properly.

Complete the dome structure by removing the 5 "A" struts and the pentagon hub from the doorway and making it the top pentagon of the dome, it is not necessary to remove each strut separately. The pentagon star can be installed as a unit.

Congratulations this is the completed dome structure!

THE DOORWAY

In order to make the doorway, the top plate of the door section and horizontal "B" strut above must be cut. Pull a string tight between the center of the top plate of the doorway section and the free hole in the top hub of the doorway pentagon. Measure off half the doorway width (19-1/2") equally on each side of the string and mark the two uppermost sloping pentagon struts using a 4 ft level to ensure that the mark are level with each other.

These marks are where the inner edge of the front sloping pieces will go. Now, mark the bottom strut of the pentagon and the top wall plate of the door opening 19 -1/2" each side of the center point.

CUTTING THE OPENING

Create the door opening by making a vertical saw cut at each of the two lines marked on the upper door section foundation wall plate, cutting through the "B" strut and top plate of doorway foundation wall top plate. The first part off the cut can be made with a Skill saw, but you will need a handsaw to finish it off. Do not cut the bottom plate unless you pour a concrete slab and the door return is firmly tied into this.

INSTALLING THE FRAMEWORK

The front sloping pieces are cut with a double bevel angle on the top. They are a right and left and, it is impossible to install them the wrong way round, as they will not fit. Have an assistant hold the top of the front sloping piece against the mark you made on the pentagon frame; the front of the wood needs to be level with the front of the pentagon framework.

Hold the wood so that the front edge is flush with the FRONT of the sawn doorway "B" strut, and make a cut mark level with the TOP of the sawn "B" strut.

Saw to this mark and install the front sloping piece in position by using 3" deck screws through pre-drilled holes at the correct angle to obtain maximum fixing power. The side of the front sloping piece is flush with the cut "B" strut.

FITTING THE DOOR FRAME

(See installing the door return foundation)

The doorframe consists of 2 long pieces @ 80 ins. and two horizontal pieces @ 39". Screw through the pre-drilled holes in the horizontal pieces into the ends of the long pieces to make the frame with inner dimensions of 80" x 36". Make sure the doorframe is square by placing it over the door itself.

Place and the door frame inside, and fix to the front sloping pieces so that the door frame is square and vertical in each direction, and the front top edge is flush with the front edge of the front sloping pieces. The bottom of the doorframe sits on the door return lumber 6 x 6, installed previously. The sidepieces are 38" long and the distance between them is 39" the piece 39" goes between them and sits 32" from the outer edge of the doorway wall plate.

Place the outer door frame 2x6 (or 2 x 4) pieces against the back of the front-sloping pieces, and make them vertical in each direction using a level. If the bevel angle is incorrect, re-saw it at this point. These pieces form a backing for the side triangles of door glazing to be fixed to so they should be cut to a length of 80-1/2" so that they project forward of the door frame by 2". Fix these 2 x 6's with screws at the top into the back of the front sloping pieces and at the bottom into the door return foundation 6" X 6" as well as into the door frame itself.

Make sure the distance between the inner faces is 39", as the door frame itself fits in here. As far as possible, have the back (inside) of the frame flush with the back of the 2x6.

Now measure and cut the wall return 2 x 4's. The bottom one sits between the front edge of the 2 x 6 and the inner stud of the door opening in the foundation wall. It is installed on its edge to give a 1-1/2" thick wall or flat to give a 2 X 4 wall. The upper wall return plate is installed so a

line halfway on the 2x4 is level with the top of the wall plate, as this piece of wall return will be the backing for:

- 1) The wall return T1-11;
- 2) The triangular door glazing.

Install the wall return 2" x 4" with 3" deck screws through the pre-drilled holes.

Three new shortened pentagon struts are fixed in place to provide backing for the doorway pentagon glazing. Two pieces of 2 x 6 lumber approx. 30" are fixed from the side pentagon hub to the front sloping pieces fixed horizontally & secured into the hub with a lag bolt and screwed with 3" deck screws into the front sloping piece. The top 2 x 6 is installed vertically from the top pentagon hub to the top of the doorframe. The hubs need to be hit with a hammer to adjust their angle to accommodate these pieces, as do the lower two

If you have the door opening outwards, it is necessary to install the door before installing the door glazing and door return T 1-11. The door can be installed right hand or left hand since the knob is located half way from the top and bottom and can open inwards or outwards as you choose.

The aluminum frame of the door should fit snugly inside the doorframe, and is fixed with the deck screws or stainless steel screws provided. Screws in every other hole are sufficient. You will need to install the handle in order to open the door. The key goes to the outside, and the restraining clips are removed. Be sure to put some screws to hold the frame in position before opening the door.

Install the wall return T1-11 plywood pieces .We usually make these long so they need to be marked level with the front of the wall and sawn so they sit flush with the outer face of the door section T1-11. They need to be notched to fit around the bottom wall plate. Fix to the door return T1-11 with 1-5/8" deck screws.

When the T1 11 is cut in our shop, typically one edge of the T1 11 is 5/8th of an inch thick and the other edge is 3/8th of an inch thick as the T1 11 has a groove. When you are installing the T1-11 for the door return, if you have the standard glazing, install the door return T1-11 with the 3/8th thickness side uppermost. If you have the premium glazing, install it with the 5/8th thickness side uppermost.

CAUTION!!

Gloves should be worn when handling glazing and metal pieces.

THE GLAZING PANELS

The dome is now ready to attach the glazing panels. This dome has the following fixed glazing triangles: (one door)

9"A-1" triangles ("B" edge marked)

16 "A-2" triangles ("B" edge marked)

20 "C2" triangles ("B" edge marked)

2 "C1" triangles ("B" edge marked)

20 Right Hand Side (RHS) "F" triangles (all 3 edges marked: "F", "C", & "D".)

20 Left Hand Side (LHS) "F" triangles (all 3 edges marked: "F", "C", & "D".)

10 Right Hand Side (RHS) "D" triangles ("E" side marked.)

10 Left Hand Side (LHS) "D" triangles ("E" side marked.)

5 "E" triangles (B edge marked)

Left and right panels around door - 2 each, upper and lower

Door entryway triangles - 2 each

There are also 3 "C" vents

INSTALLING THE VENTS

It is best to attach the vents before fixing the glazing (see section on vents).

On the 42' dome there are three "C" vents. There are 5 possibilities of locations for the 3 "C" vents.

The vents should be mounted so that the hinge side is towards the strongest prevailing wind. The paper model is set for a wind from the west. Know that you can move the vents to suit your location.

The vents may need to have the rain shed trimmed if you find that they interfere with each other. Place a vent in position with the hinges at the top over a "B" strut. Attempt to centralize the vent, and have an assistant inside to tell you when the vent is central in its opening. Screw through the 4 hinge holes into the "B" strut. The hinge edge is taped after the glazing is installed.

THE VENT CROSSBAR

The vent crossbar is installed parallel to the strut that the vent is hinged on and in such a manner that the holes, which are drilled diagonally on the end, follow the line of the strut. Put two 1 5/8" deck screws through these holes. The upper vents have Bayliss Hydraulicheck openers. The vent opener is screwed through the center holes in the crossbar, with the vent opener pointing away from the hinge side, screwing through the holes in the crossbar with the nuts and bolts provided in the kit.

Fix the vent opener onto the crossbar with the adjusting nut pointing downwards, and place the other end of the actuating arm against the glazing making sure the pressure of the opener is acting in a straight line, not sideways. The Bayliss Hydraulicheck opener is designed to open slowly, so apply firm but constant pressure. Make a mark through the slots onto the glazing; this is where you will drill through with a 3/16" bit. Now have an assistant on the outside ready to put nuts and the backing plate on the #10-32 bolts that are used to secure the vent opener to the vent glazing. Tighten these screws so that, at no point, does the actuator mechanism bind on the vent itself.

THE RESTRAINING CORDS

In order to prevent the vents from opening too far during high winds, we use nylon cord, which is attached to both an eyebolt in the vent itself and to screw eyes in the vent frame opening.

Use a 1/4" drill to drill through the vent in such a location that the cord does not interfere with the actuator, usually about 1 ft from the tip of the vent. Push the 1/4" screw eye through the hole from the inside and put on washer and nut on the outside and tighten one full turn beyond finger tight. Put a cord through the eyebolt, and fasten with two half hitches.

Open the vent to the maximum opening that the vent actuator will allow, and then, having screwed in the eyes to the wooden framework, tie the cords tight. The vents usually have two cords and two screw eyes.

In exceptionally windy locations you may be provided with check chains or an extra hydraulic dampener.

THE VENT GASKETING

The vent gasketing is not cut to length, as this can vary. If in your kit there is not enough full length pieces of gasketing, we find it is preferable to fit the gasketing before fitting the crossbar for the full length gasketing on the top vents and if you have to butt a piece of gasketing against each other, do that in the lower vents. Butting the gasketing doesn't lead to any problems at all.

It is best cut accurately to meet at the corners of the vent. It can be easily cut with a hacksaw, shears or strong scissors.

Cut the gasketing to length: The hinged side of the vent does not usually need gaskets. Now, place the length of gasket in position with the rubber side towards the vent itself and press to make a seal against the vent. Mark the inner edge of the metal of the gasket before you install it. You need to open the vent in order to install the gasket and this line will show where the gasket needs to be located.

Screw the gasket firmly in position with the 1/2" screws provided. You will need a #1 Phillips driver bit for this purpose. The vents are now installed.

ATTACHING THE GLAZING

When we ship you the glazing for the 42' dome, you will notice that the tip of each A-1 triangle is an added on piece of glazing and we have put some paper in between each tip as we have found the tape has a tendency to stick to itself, and the paper needs to be in place to prevent this from happening.

Before attaching the panels, remove the protective plastic film from both sides of the panel, making sure the outer side will be on the outside of the dome, as this is the U/V treated side. For your convenience we put a dot on the corner of the glazing opposite the "B" side of the triangle, or as marked on the paper model. The dot indicates that this side goes out i.e. toward the sun. When placing the panels on the ground, put them on a sheet or clean piece of plywood, as the panels are very electrostatic, and attract dirt and dust. Always stand them on

edge with the tubes parallel to the ground. Screw through the edge of the panels 3/8" from the edge using 1-1/4" stainless screws with 16 millimeter glazing (triple wall). Put five screws on each edge, spaced equally, with the first screw 6" from the point of the triangle. Screw to a depth so that the head of the screw ends up flush with the surface of the glazing. This makes the taping process easier. We have found it works well to put a screw into the taped tip for added security, although the tape is perfectly adequate to secure them.

Make sure the panels are fixed so that the edge of the panel is level with the centerline of each strut. Ideally, the edge of the panel goes not quite halfway over the head of the bolt, and the point of the panel is over the center hole in the hub. It is best to start at the top of the dome and work your way down.

We make every attempt to cut the glazing triangles to fit accurately, however, there are certain variables that make it not uncommon for there to be a gap between the triangles and this is not a problem as the space is covered by the tape, creating a dead air space. As long as the glazing rests on the strut the fit is satisfactory.

If there is a gap between the glazing panels of more than an inch, when screwing down the panels, it is advisable to offset the screws instead of putting them opposite each other and this way the tape can be adjusted to cover each of the screws in turn.

Fix the top 5 "A-1" triangles, then work around the dome one layer of triangles at a time. The first series will be "C1", "LHF", "RHF", "C1", "LHF", "RHF", "C1", repeated five times. The glazing needs to be installed so that the tubes drain out. This is why the "C2" panels have the tubes parallel to the "B" side, and the "C1" panels have the tubes parallel to a "C" side. The model again proves its worth at this point! Use it!

The next series of panels consists of "LHF", "D(R)", "E", "D (L)", "RHF", repeated five times. The next series of panels consists of "C2", "RHF", "D", "LHF", "C2", "A2", "A2", repeated five times. The final series is "A2", "A1", "A2", "C2", "LHF", "D", "RHF", "C2", repeated five times.

Note: Leave off the row of screws where the bottom triangles attach to the foundation wall until the bottom cap is installed.

THE DOOR PANELS

There are six door panels:
2 Front panels subdivided into upper and lower pieces
2 Entryway triangles

The top two front panels to meet in the center above the doorway, and may need to be trimmed to fit the doorframe in place. They are screwed to the extra pentagon lumber installed after the pentagon struts are removed.

The door panels are usually provided larger than needed, as experience has shown that the shape of the door pentagon can vary when the struts are removed. Attach the doorway panels last and trim where necessary, keeping the factory edge and marking the panel where it overlaps the adjoining panel. Cut using a fine-toothed saw blade and blowing the dust out of the tubes with a vacuum cleaner exhaust or compressed air source.

Attach the entryway panels first. These are marked right and left. The bottom should butt up against the wall-return T1-11, the inner edge against the doorframe, and the front edge is trimmed flush with the outer edge of the front-sloping piece of lumber. The lower front pieces are marked and cut on the outer edges i.e. away from the door opening, as the inner edge is held level with the already-installed entryway triangles. The triple wall glazing overlaps by 1/8" and is caulked with a fine bead of caulk as a final finish detail. The top piece(s) overhangs the doorframe by 1 inch to shed the rain, and is marked and trimmed where necessary.

INSTALLING THE BOTTOM CAP

The bottom cap comes in two sizes: 8 mm and 16 mm according the type of glazing you have chosen. It is usually predrilled with 1/8" holes drilled at 1 ft intervals to allow for drainage of condensation, if not you may want to do this yourself before installing.

The pieces of plastic bottom cap (U-shaped plastic channel) fit on the bottom edges of all the glazing panels adjoining the foundation wall. They have a long and short side as you look at them in cross section, and the long side goes to the outside of the dome. They simply snap or slide in place and the fitting can be expedited using water or oil as a lubricant. The ends butt against each other. They can be fitted before or after the taping is done. Attempt to have them all at the same level, and make the final adjustment when the horizontal trim strips are installed. They butt closely to the horizontal trim strips and are screwed through the glazing when this butt joint is satisfactory.

There are 5 sizes of bottom cap:

10 "C" pieces

4 "B" pieces

5 "E" pieces

3 Doorway pieces: 2 sides and 1 above doorway pieces (May come as an extra "B")

THE TRIM STRIPS

Before installing the trim strips it is good to install the lower hub covers. These are rectangular pieces of sheet metal, and cover the junction between the trim strips, bottom cap and glazing triangles. They are simply screwed in place to the struts as they overhang the wall. They may need to be trimmed if the bottom strut is extra tight against the wall plate.

After all these items are installed we usually put some sealing foam to complete the process of making this junction airtight. If the wall sections do not meet together accurately, for whatever reason, the same foam sealant can be used to seal between them before installing the vertical trim strips.

The wooden trim strips are now screwed into position. The strips are:

40 Vertical strips 1' 4-3/4" (vary according to height of foundation wall) x 1-1/2" with a 9-degree bevel

19 horizontal strips 5 E, 10 C, 4 B

2 horizontal doorway strips 12-1/2" x 1 3/4"

4 Vertical strips 1' 4-3/4" x 1-1/2" for finishing the door detail

The vertical trim strips have bevels that meet so that the joints fit neatly when screwed into position. When installing, adjust them so that the beveled edges fit neatly together and they butt up to the bottom cap. The horizontal trim strips butt against the tops or the sides of the vertical strips, according to the amount of dome overhang and may need to be trimmed to fit and meet the pieces of the bottom cap at the bottom edge of the lower glazing panels, fitting snugly up to them. Any discrepancies can be filled using silicon caulk or foam sealant.

NORTH WALL INSULATION

Using the paper model, identify where the north wall insulation (Reflectix™) will be placed. You will need the following triangles as shown on the paper model.

If your insulation comes as a roll, you will need to cut the triangles otherwise you will receive the triangles pre-cut. Using each type of glazing triangle as a template, mark the Reflectix™ insulation. Use scissors or utility knife to cut insulation and mark the triangle type and edge of the insulation triangles.

The reflectix triangles are marked with small letters on one side e.g. A ∇ B meaning an A triangle and this is the B-side. In the case of the left and right hand "F" triangles, all 3 sides are marked.

Use a staple gun to fasten insulation to struts, putting nine staples on each side of the triangle. Attach the insulation to the inside of the dome after the glazing is secured. The corners overlap at the hubs and staple as close to the hubs as possible. It is best to install the Reflectix™ before installing the water tank. A roll of reflectix tape is provided for taping all seams.

CIRCULAR TANK OPTION

MATERIAL LIST FOR THE CIRCULAR TANK

1. 4 pieces of galvanized 22-gage sheet metal: 2 pieces 10-feet by 4-feet, and 2 pieces 8-feet by 4-feet.
2. 1 pint Muriatic acid for etching the sheet metal to accept paint (or buy pre-primed metal for the front surface of the tank)
3. 1 quart of paint suitable for metal - any dark color such as black/blue/green/red/purple.
4. * 144 1/2" by 1/4" SS bolts and nuts.
5. * Vinyl or plastic liner, 8 - 20 millimeters thick, 20 feet by 20 feet (black) or 12 ft circular (blue)
6. * Pool coping 36 feet.
7. Sand or vermiculite for bottom of tank. 6- 5 Gal buckets (or equivalent measure)
8. Duct tape for covering bolt heads.
9. 2 Spacer blocks 6" x 6" x 1 ft 4" (or wall height) pressure treated behind tank

* **Provided by Growing Spaces®**

FABRICATION OF WATER TANK

You may be able to get pre-primed sheet metal ready to paint, ask your supplier, in which case the following steps are not needed.

Lay out the sheet metal on a flat surface in preparation for etching with Muriatic acid to make paint adhere properly. Care should be taken when using acid and proper protection is recommended! Apply Muriatic acid (1:3 solution, of acid: water) with a clean paintbrush. Always add the acid to the water! Wait about 10 minutes or until metal is etched, then wash thoroughly with water. After the metal is completely dry, apply paint with a roller on the one etched side of the pieces of sheet metal. The paint should be a dark color, such as black, dark blue or red, to absorb the sun's energy more easily. A second coat of paint is usually required. You can paint before or after drilling the holes. Only the out side of the tank needs to be painted.

The water tank consist of 2 10-foot plus 2 8ft -foot pieces of sheet metal connected by 1/4" stainless steel bolts overlap the two pieces of painted sheet metal about 3 inches and with a 1/4" bit, drill 2 rows of holes through both sheets at 2" spacing. It is helpful to secure the pieces of sheet metal together with clamps during drilling. Mark the joining sections with numbers so they match up properly when bolted together. Make use that all the nuts are on the **outside** of the tank when attaching.

INSTALLATION OF WATER TANK

Dig down 3 to 4 inches below the bottom of the foundation wall in the shape of the round tank. The tank will be approximately 11 feet round. **The floor of the tank must be level.**

Attach two 6" x 6" x 1' 4" spacer blocks 1 ft from the junction of each north "C" foundation wall section behind the tank with 3 inch screws diagonally into the top and bottom wall. Attach the back section of sheet metal to the spacer blocks with 2 @ 5/16" by 2" lag bolts and washers to secure the tank to the north wall of the dome. Check to make sure that the back

section of the tank is level, adjust until it is level to within an inch or so. Attach the rest of the sections to the back section of the tank sheet metal with 1/4" x 1/2" stainless steel bolts and nuts through the pre-drilled holes.

You should have a round tank. Check to make sure that all the sections of the tank are level, adjust until level. Tape all screw and bolt heads inside tank with duct tape to prevent rupturing the tank liner. You will need a ladder to get in and out of the tank. Bare feet are recommended once the liner is installed. Make sure the floor of the tank is free of all rocks and clods, and rake level.

Place sand or vermiculite in the bottom of the tank to insure a smooth bottom for the tank liner. Slope the sand up the edges of the sheet metal 6" to 8" to insure a smooth bottom for the tank liner. When the liner is installed there can be pleats. After adding a few inches of water to the tank adjust the remaining slack over the top front and rear edge of the tank. Slip on the top cap and trim excess liner off.

CAUTION Remember to back fill dirt around the bottom of the tank before you add too much water.

ELLIPTICAL TANK OPTION

MATERIAL LIST FOR THE VESICA PISCES (ELLIPTICAL) TANK

1. 4 pieces of galvanized 22-gage sheet metal: 2 pieces 10-feet by 4-feet, and 2 pieces 4-feet by 5-feet.
2. 1 pint Muriatic acid for etching the sheet metal to accept paint (or buy pre-primed metal for the front surface of the tank)
3. 1 quart of paint suitable for metal - any dark color such as black/blue/green/red/purple.
4. * 2 pieces of angle iron 4 feet by 2 inches.
5. * 144 1/2" by 1/4" SS bolts and nuts.
6. * Vinyl or plastic liner, 8 - 20 millimeters thick, 22 feet by 14 feet.
7. * Pool coping 14 feet.
8. Sand or vermiculite for bottom of tank. 6 5-Gal buckets (or equivalent measure)
9. 2 pieces 14' x 2" x 6" for lumber for top "T" beam bracing. 1 piece 1' x 2" x 6" of pressure treated lumber for bottom brace.
10. Duct tape for covering bolt heads.
11. 6 Spacer blocks 6" x 6" x 1' 4" (or wall height) pressure treated or blocks made from 2" x 6" for behind tank

* **Provided by Growing Spaces®**

FABRICATION OF OVAL WATER TANK(S)

You may be able to get pre-primed sheet metal ready to paint, ask your supplier, in which case the following steps are not needed.

Lay out a 10-foot and a 5-foot piece of galvanized sheet metal on a flat surface in preparation for etching with Muriatic acid to make paint adhere properly. Care should be taken when using acid and proper protection is recommended! Apply Muriatic acid (1:3 solution, of acid: water) with a clean paintbrush. Always add the acid to the water! Wait about 10 minutes or until metal is etched, then wash thoroughly with water. After the metal is completely dry, apply paint with a roller on the one etched side of the two pieces of sheet metal. The paint should be a dark color, such as black, dark blue or red, to absorb the sun's energy more easily. A second coat of paint is usually required. You can paint before or after drilling the holes. Only the front side of the tank needs to be painted.

The front and backsides of the water tank consist of a 10-foot plus a 5-foot piece of sheet metal connected by 1/4" stainless steel bolts. Using the piece of 2" angle in your kit as a template, overlap the two pieces of painted sheet metal about 2-1/2 inches and with a 1/4" bit, drill holes through both sheets at 2" spacing. This is the front of the water tank. It is helpful to secure the two pieces of sheet metal together with clamps during drilling. Repeat this step with the two unpainted pieces of sheet metal. This is the backside of the water tank. Mark the joining sections with numbers so they match up properly when bolted together. Next, bolt the front painted sections together, and then bolt the back unpainted-painted sections together. Make use that all the nuts are on the **outside** of the tank when attaching.

Place a piece of angle on one *end* of the painted sheet metal, and use as a template for drilling holes in sheet metal. Mark the sheet metal and 2" aluminum angle so that they can be attached later. Using the other side of the same piece of 2" aluminum angle, repeat this step with the unpainted-painted sheet metal. Now repeat the above for the other end of the sheet metal.

Bolt the two pieces of 2" aluminum angle to the back (unpainted) section of sheet metal. Place the 2" aluminum angle so that it will be facing inside the tank structure when the tank is fully assembled.

INSTALLATION OF WATER TANK (S)

Dig down 6 to 9 inches below the bottom of the foundation wall in the shape of the elliptical tank. Measure 15 feet (7 feet each side of the north point of the dome) around the inside perimeter of the foundation wall and mark with stakes 6 inches away from the inner surface of the wall. The tank will be approximately 14 feet long and approximately 5 feet 6 ins wide and 4 feet deep. If you are installing 2 tanks, adjust these instructions accordingly

The floor of the tank must be level.

Attach two 6" x 6" x 1' 4" spacer blocks 1 ft from the end of each foundation wall section behind the tank with 3 inch screws diagonally into the top and bottom wall plates (6 blocks in all). Attach the back section of sheet metal to the spacer blocks with 12 5/16" by 1-1/2" lag bolts and washers to secure the tank to the north wall of the dome. Check to make sure that the back section of the tank is level; adjust until it is level to within an inch or so. Attach the front section to the back section of the tank sheet metal with 1/4" x 1/2" stainless steel bolts and nuts through the pre-drilled holes.

You should have an elliptical tank. Check to make sure that the front section of the tank is level and adjust until it is level. Tape all screw and bolt heads inside tank with duct tape to prevent rupturing the tank liner. You will need a ladder to get in and out of the tank. Bare feet are recommended once the liner is installed. Make sure the floor of the tank is free of all rocks and clods, and rake level.

We have found it is best to install some kind of insulation contacting the back piece of sheet metal of the water tank minimizing the heat loss through the back of the tank. Materials used for this can vary – if plastic wrap batt insulation is available at your local hardware store, this is a preference we would recommend, but you can use rigid foam insulation, reflectix insulation or even vermiculite or perlite poured in the air space behind the tank. We have started using the waste plastic covering from the glazing for this purpose. Cut and bevel one piece of the 14-foot long 2" x 6"s to fit snugly and brace tank on the bottom of the tank between corners of the 2" aluminum angle. Place sand or vermiculite in the bottom of tank to insure a smooth bottom for the tank liner. Slope the sand up the edges of the sheet metal 6" to 8" and over the bottom brace to insure a smooth bottom for the tank liner. One 2x6 top piece and one 2x6 are screwed together to form a "T" beam. The horizontal piece is the 2 x 6, 2" longer than, and screwed to the vertical piece of the "T" the 2 x 6. This prevents the long lumber brace from sagging and assists the brace to fit snugly at each end. The bottom of the upper 2x6 is level with and sits on the top of the tank metal. When the liner is installed there are many pleats at the corners. After adding a few inches of water to the tank adjust the remaining slack over the top front and rear edge of the tank. Slip on the top cap around front and trim excess liner off.

CAUTION: Remember to back fill and pack dirt around the bottom of the tank before you add too much water, especially at each end at the bottom of the aluminum angle, as this is where there is most pressure.

TAPING THE DOME

This tape is used on aircraft and is very strong and long lasting. Its life is from 5 to 10 years and can be reapplied as required. Taping should be done when the temperature is above 60° F and the glazing is perfectly dry. Don't tape when the day is windy or dusty. When first installed, the dome is very electrostatic, and attracts dust.

Using the paper model and video, identify the major continuous strut lines or what we refer to as "eye brows". The taping should start with the major "eye brows" at the bottom edge of the dome and go completely over the top to the bottom of the other side of the dome. It works best if there are two people, one on the top of the dome (very safe if you keep your weight over the struts) and the other at the bottom when working with the "top eyebrow". A long ladder can assist the person on the bottom hand the tape to the person on the top. When working with the middle eyebrows, two people with a ladder each passing the tape to each other is the best method. The lower eyebrow can often be done without ladders.

Tape should be rolled with wooden rollers provided from hardware store to further adhere tape to the glazing. This can be done as tape is applied or soon after. Tape is very strong and elastic and, can be cut most easily with scissors or a sharp knife. Always wipe glazing joints to be taped with a clean cotton rag and isopropyl alcohol first. Make sure the tape covers not only the seams between the glazing panels but also the screws attaching the glazing. Where the

layers of tape cross over each other, often a minute capillary gap is created which potentially lets through dust and rain. This minute gap can be avoided by pressing down the overlapping tape with a fingernail or a blunt instrument, such as a screwdriver. If the tape does not go over both screws, it is customary to cut a small square of tape to put over the head of the screw, which is not covered by the strip of tape.

When taping the vents, it is best to put the vent hinge tape on last and this tape overlaps the metal of the vent by 1/4 of an inch and is pressed against the inside of the C panel and finally pressed onto to the glazing. If you need to use two lengths of tape to accomplish the coverage desired, it is perfectly OK to do this.

When taping the top vent, the hinge side of the vent, there is created a potential leakage point where the tape rises to go over the rain shed (bent aluminum sheet). This can be avoided by the use of a small amount of silicone caulk to fill the gap.

Don't stretch the tape too tight especially where the screws dimple the glazing strongly or else the tape will tend to pull away from the glazing creating a potential source of leakage.

COOLING FANS

The 42 ft dome is cooled by a combination of the top opening vents allowing the escape of hot air and lower vents and cooling fans bringing in cooler air at the lowest level of triangles. The fans are thermostatically controlled with an outer hood, opening shutters and are usually powered by 110v or can be replaced with a photovoltaic panel option.

The location of the fan is usually in a "D" triangle, on the east, south and west parts of the dome, but this can also be at the owner's discretion.

INSTALLING UNDER-SOIL HEATING DUCT

These pipes are laid in 2 separate trenches, with the upper surface of the pipe one foot below the final topsoil level. The first pipe should be at approximately 1' 6" from the outer edge of the dome layout and the second pipe at 2' 6" from the outer edge of the dome layout. These pipes meet as they curve up and project 6 inches above the final soil bed level at the south point of the dome and re-emerge in front of the water tank, again, 6 inches above the final soil bed level

If you meet the doorway return lumber as you dig the trench for these pipes, you can either dig deeper to go underneath the door or you can simply route the pipes around the doorway. The ideal depth is 1'4" below the finished level of your topsoil.

If you have a 2' wall on your dome, you don't need to bury the under soil insulation pipes.

Simply put your soil on top of the pipe – lay the pipe on the ground, if you are having raised beds.

Replace the soil to grade level on top of these pipes.

The main function of the under soil heating is to keep in check the cold ground temperature on the outside of the dome that may be trying to penetrate inside.

When installing the under soil box(s), it is customary to bury the box half way so that 6" are buried in the ground and 6" are above the ground.

THE UNDERSOIL HEATING SYSTEM

Where the four under soil heating pipes come together on the south side of the dome, you will need to cut them off 6" above finished soil level.

If your box is not already assembled, screw together the five sections of the under soil heating distribution box with the piece with the 4" hole in it on the top of the box. Attach the fan into the box on the underside of the lid with the arrow showing the airflow pointing upwards, using 1-5/8" deck screws through each of the four holes in the corner of the fan. Install the switch on the inside of the box in the rectangular slot. The other hole is for the cable from the solar panel to come into the box.

INSTALLING THE SOLAR PANEL(S)

The solar panel(s) is/are installed on the south side of the dome, so that it/they slopes at approximately 45 degrees to the horizon in order to get maximum solar input, especially in the winter months. The panel can be held in place by three 2-1/2" deck screws screwed through the glazing into dome struts that are underneath the panel. If the deck screws are inserted at a slight angle, they will hold the panel in place quite effectively. If you choose to have a more elaborate mounting, this is fine, too. Two pieces of 2 x 4 can be mounted vertically and fixed using long screws that go through the glazing, then the panel can be fixed to these with 1 5/8" deck screws.

Follow the installation instructions that come with the panel, and drill a hole through the glazing next to a strut for the cable to go inside the dome. Seal around this hole with silicone sealant. Staple the electrical cable in such a way that it runs down the side of the struts that can be used to make the shortest pathway from the panel to the box. Push the end of the cable into the box through the hole you have made, and connect it in such a way that the switch can be used to put the fan on and off as desired. A fine mesh screen can be stapled to the top of the box to prevent "inquiring" fingers and ladybugs from being decimated by the blades of the fan.

Now the under soil heating box is installed over the top of the four under soil heating ducts and buried in the soil to a depth of 3", so that when the fan is running, the only place for the air to travel is along the ducts. Move and trim the other end of the ducts so that they emerge from the ground just in front of the water tank and project above the finished soil level by a distance of 4".

COMPLETING THE DOME

All the different parts of the dome have now been installed. The next part is the fun part of designing the pathways and soil beds! I have found that plants grow best when planted directly into the ground itself, and most people find that raised beds seem to produce the best crop.

However, you can build a platform on top of the tank(s) to hold flats and pots, and also have removable racks at waist level for the same purpose. Hanging pots can be installed and can hang either from hooks screwed into the frame or from the hub itself or any of the bolts around the hub. We at Growing Spaces® are always available to answer questions on installing or growing in the dome. So, now just enjoy your dome and HAPPY GROWING!!