

# Solatube® Brighten Up® Series Installation Instructions

## Solatube 160 DS (10 in/250 mm Daylighting System) and 290 DS (14 in/350 mm Daylighting System)



### PARTS LIST

	Quantity
1. Dome with Raybender® 3000 Technology	(1)
a. Shock Inner Dome (not included in some kits)*	
2. Roof Flashing (Pitched or no pitch)	(1)
3. Top Tube Assembly including	(1)
a. Dome Ring (with integrated spacers and seal)	
b. Dome Ring Seal	
c. Spectralight® Infinity Top Tube with Angle Adapter	
4. Spectralight® Infinity 16 in (400 mm) Extension Tube	(2)
(not included in some kits, see label on box)	
5. Bottom Tube assembly including	(1)
a. Spectralight® Infinity Bottom Tube with Angle Adapter	
b. Ceiling Ring (with integrated fastening clamps)	
6. Dual Glazed Diffuser	(1)
7. Seal and Fastener kit including	
a. Dome Ring Screws - #8 X 1 in (25 mm)	(5)
b. LightTracker™ Reflector	(1)
c. Flashing Screws - #10 X 2 in (50 mm)	(8)
d. Roof Sealant	(1)
e. Expansion Joint Seal	(1)
f. Tube Screws - #8 X 3/8 in (10 mm)	(10)
g. 2in (51 mm) Foil Tape - 18 ft (5.5 m) roll	(1)
h. Drywall Screws - #6 X 1 5/8 in (40 mm)	(4)

### Required Tools:

1. Electric Drill
2. Keyhole Saw
3. Saber or Reciprocating Saw
4. Hammer
5. #2 Phillips Head Screw Driver/Screw Gun
6. 1/4 in (5 mm) Slotted Blade Screwdriver
7. Tape Measure
8. Flat Bar
9. Wire for probing
10. Caulking Gun
11. Plumb Bob
12. Lumber Crayon
13. Utility Knife
14. Magnetic Compass
15. Required Safety Equipment

\* High Velocity Hurricane Zones: Shock Inner dome must be installed with dome. To meet HVHZ requirements, use a six inch no pitch flashing or a pitched flashing with a four inch turret extension.



# WARNING



**Do not proceed with the installation until you have read the entire instructions, including these warnings. (Use of materials or methods not authorized by Solatube will result in an invalid warranty.)**

Solatube International, Inc. (seller) assumes no responsibility or obligation whatsoever for the failure of an architect, contractor, installer, or building owner to comply with all applicable laws, ordinances, building codes, energy codes, fire and safety codes and requirements, roof warranties and adequate safety precautions. Installation of this product should be attempted only by individuals skilled in the use of the tools and equipment necessary for installation. Protect yourself and all persons and property during installation. If you have any doubt concerning your competence or expertise, consult a qualified expert before proceeding.

## **Install at your own risk!**

Solatube product installations may be dangerous and include the potential for death, personal injury and property damage. The hazardous conditions include but are not limited to the following:

- **During installation, the Solatube Daylighting System's reflective tubes may focus sunlight, causing intense heat or fire. Remove protective film only after the parts have been installed. Prior to and during installation, do not leave tubes in contact with combustible materials or unattended, especially near direct sunlight. Avoid skin burns.**
- Sheet metal edges may be sharp. Use protective gloves to avoid lacerations.
- Solatube Daylighting System installations require climbing and working at dangerous heights, including on ladders, scaffolding, roofs and in attic spaces. Risk of death, personal injury and property damage may result from a fall, or from falling objects. Use extreme caution to minimize risk of accidental injury, including, but not limited to the following procedures:
  - o Clear area below your work space of all people, animals and other items.
  - o Avoid working on surfaces that are slippery or wet.
  - o Use foot-wear with excellent traction.
  - o Use only strong, well supported ladders.
  - o Work only in calm dry weather.
  - o When in the attic, ensure that your weight is supported at all times with structurally sound framing; drywall material is not designed to carry a person's weight.
- To reduce the risk of fire, electric shock, and personal injury; basic safety precautions should always be followed when using electric tools, including always wearing safety goggles or other suitable eye protection, and ensuring work area is clear of all electrical wires, gas pipes, water pipes, and other obstacles.
- When working in the attic or other dusty areas, use of a mask or respirator is recommended to avoid lung irritation. Attic spaces may be dark, confined, and subject to extreme temperatures. Beware of sharp protruding objects. Do not attempt installation without having someone within range of your voice or close enough to come to your aid if necessary.
- The Solatube Daylighting System is not designed to withstand the weight of a person, tools or other objects. Walking or placing objects on the system could cause personal injury and property damage. If the dome is broken or cracked, or if the product is otherwise damaged, the structural capacity may be weakened, and the system should be repaired immediately. For safe installation and use, do not deviate from these installation instructions.
- Foil tape is not intended for use as structural support of the Daylighting System extension tubes. For structural integrity, use manufacturer supplied fasteners on all overlapping extension tube joints.

## **Installation Tips**

- Allow at least 2 hours for the installation, particularly if this is your first installation.
- All adhesives, seals and tapes are recommended to be applied to a dry surface at a minimum of 70°F for maximum performance.
- Foil tape contains a pressure sensitive adhesive. Pressure must be applied to foil tape at all seams for proper bonding.
- During the day, turn off all the lights in the room to see how much natural light comes in through the windows, and determine the best position for the Solatube Daylighting System. To light a specific area, place the system over the area, not in the center of the room. This will prevent the desired area from being shaded by tall objects in the room.
- Avoid roof locations shaded by trees, ridges and chimneys, or near water channels or valleys.
- Avoid roof areas with obstructions such as gas, water or drain pipes, air ducts, flues or furnaces, or HVAC equipment.
- Make sure the roof is adequate to endure an installation without damaging its water proofing properties or weakening the building structure.

## MARKING THE CEILING LOCATION

**Step 1:** Select the desired location on the ceiling. Use a hammer or stud finder to locate a space between the joists in the ceiling. Tap lightly to identify ceiling joists. Hammer a small nail through the ceiling to mark the approximate location.

Remove small nail and insert and twist a bent piece of wire 360° in small hole to make sure there is a minimum clearance of 5 3/8 in (140 mm) for a Solatube 160 DS or 7 3/8 in (190 mm) for a Solatube 290 DS between the nail hole and any joists or obstructions. While turning the wire, push it up through the ceiling hole to ensure that no other obstacles, pipes, wires or vent ducts are in the tube path up to the roof (**Diagram A**). If obstacles exist, move to an appropriate location and check again for clearance. For short installs without attic access, use a long drill bit to drill from the nail hole up through the roof.

## ROOF LOCATION

**Step 2:** In the attic, locate the nail/wire. Adjust the location to avoid joists or obstacles in the tube's path to the roof and to ensure clearance (**Diagram B**). Use a plumb bob or level to find the roof location directly over the center of ceiling hole. Transfer this location onto the roof surface by driving a nail/screw through the roof. While in the attic, get bearings of the roof nail/screw location to make it easier to find the location of the nail on the roof.

Note: If the roof opening cannot be made directly above the ceiling opening, the roof opening may be relocated. If relocated, the top and bottom tube angle adapters may both need to be adjusted to the correct angle (the maximum angle achieved by each of the angle adapters is 30°) (**Diagram C**). 0-90 degree extension tubes are available if necessary.

## CUTTING THE CEILING HOLE:

**Note:** Do not cut ceiling hole until you are sure that the flashing fits in the desired location.

**Step 3:** Mark a 10 3/4 in (275 mm) circle for the Solatube 160 DS or a 14 3/4 in (375 mm) circle for the Solatube 290 DS centered on the final ceiling location. Cut along the ceiling as marked (**Diagram D**).

**Step 4:** Insert the bottom tube assembly into the ceiling and if the installation is not vertical, rotate angle adapter to align bottom tube with roof flashing location. Using screw gun, rotate and tighten two of the fastening clamps to temporarily attach the bottom tube assembly to the ceiling (**Diagram E**). Do not remove protective liner from inside of tube until instructed.

## See Optional Installation Section

- 1 Climate Control Options (page 6)
2. Curb Mounted Flashing (page 6)
3. Universal Tile Flashing (page 7)
4. Spectralight® Infinity 0-90 Degree Extension Tube (page 8)
5. Turret Extension (page 8)
6. Dome Edge Protection Band (page 9)
7. Flat Roof (page 9)
8. Cement Tile (page 10)

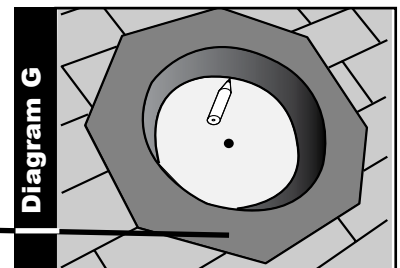
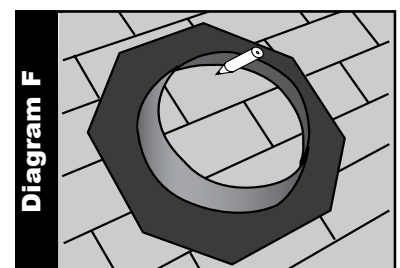
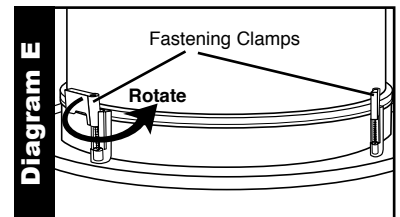
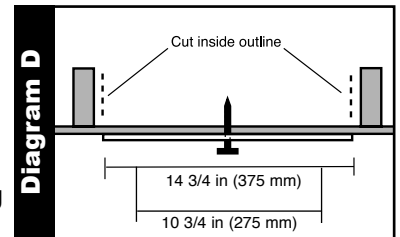
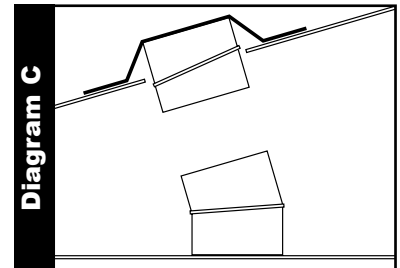
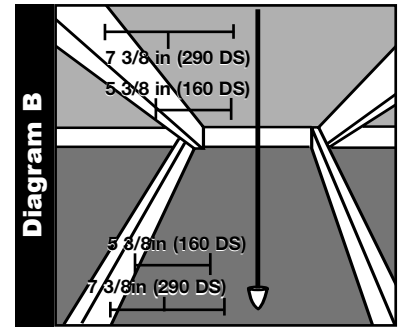
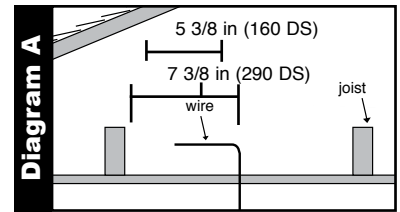
## ROOF FLASHING INSTALLATION

**Note:** To meet HVHZ requirements, use a six inch no pitch flashing or a pitched flashing with a four inch turret extension.

Caution: Wear gloves while working with metal Solatube components.

**Step 5:** Take the roof flashing, LightTracker™ Reflector, top tube assembly, dome, flashing screws, dome ring screws, foil tape, sealant and appropriate tools onto the roof. Center the roof flashing over the nail/screw and mark the inside circumference onto the shingles with a lumber crayon (**Diagram F**). Using a saber or reciprocating saw, cut through the roof 1/2 in (12 mm) outside the marked line.

**Note:** If rafter spacing does not permit cutting 1/2 in (15 mm) larger than the marked circle, cut the shingles and felt underlayment 1/2 in (15 mm)



outside the marked line to expose the roof deck (**Diagram F**). Turn flashing upside-down and center over the nail/screw. Trace the inner circumference of the flashing turret onto the bare roof (**Diagram G**). Using a reciprocating or jig saw, cut outside this line, being careful not to cut any framing members, concealed pipes or electrical wires.

**Step 6:** Using a flat bar, break the asphalt sealing tabs of the shingles and carefully pull out the staples or nails above the midpoint to upper edge of the hole. Remove enough shingles to expose the felt underlayment, at the middle and surrounding the top of the roof hole (**Diagram H**).

**Step 7:** With a caulking gun, apply a 3/8 in (10 mm) bead of roof sealant around the underside of the flashing base along the line of screw holes (**Diagram I**). Use only Solatube recommended sealant for the installation. The top half of flashing seals to the roof underlayment. The bottom half of flashing seals to the shingles.

**Step 8:** Turn the flashing upright and center over the roof hole, fasten flashing to the roof and underlayment with 2 in (50 mm) flashing screws applied at each pre-punched hole. Do not over tighten. Coat the screw heads with sealant. Replace the shingles and refasten them into place. Fill all the old fastening holes, and resecure the shingle tabs every 4 in (100 mm) with spots of roofing sealant under each tab (**Diagram J**).

### TOP TUBE INSTALLATION:

**Step 9:** Insert top tube assembly into roof flashing, lining up the dome ring screw holes with the flashing pre-drilled holes. Push down on top tube assembly so that dome ring seal is seated on flashing. Manually set one dome screw without penetrating the tube to hold the dome ring in place. Rotate the angle adapter so that top tube aligns with the bottom tube. "X" and "Y" lengths should be equal. Bottom angle adapter can be adjusted to achieve this measurement. Record this length for later use in determining extension tube length requirements (**Diagram K**).

**Step 10:** Remove the dome screw and top tube assembly. Tape the top tube angle adapter and tube rivet seams (**Diagram L**).\*\* **Remove protective liner** and replace the assembly into the flashing. Align the assembly again with the bottom tube and the pre-drilled fastening holes. Fasten the dome ring to the flashing and tube.\*

**Step 11:** Using a magnetic compass, position the LightTracker Reflector with the inside (reflective side) facing due South (due North for Southern Hemisphere locations). Align the holes in the reflector with the tabs in the dome and snap into place. **Peel protective liner from the reflector.**

### DOMES INSTALLATION:

**Note:** For High Velocity Hurricane Zones, Shock Inner Dome needs to be installed first. Align the tabs of the inner dome with the snaps on the dome ring and press down into place. Check to make sure that the snaps are fully engaged (**Diagram N**).

**Step 12:** Align the four tabs on the dome base with the snaps on the dome ring and press down into place. Check to make sure that the snaps are fully engaged (**Diagram M**).

### EXTENSION TUBE ASSEMBLY IF REQUIRED:

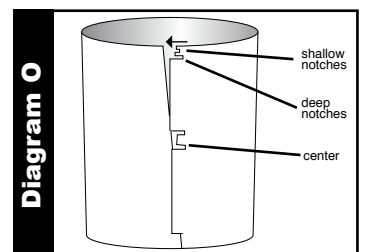
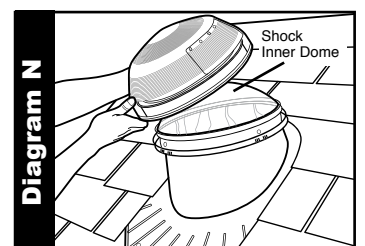
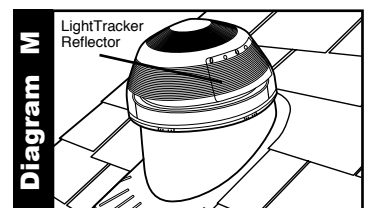
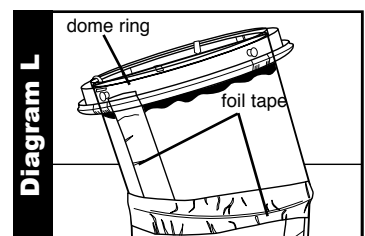
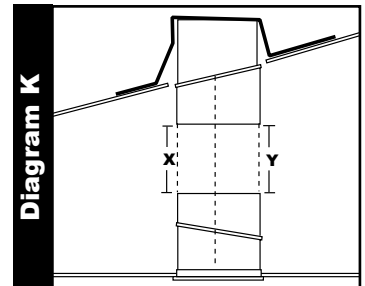
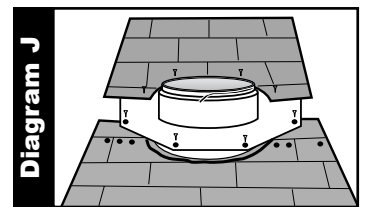
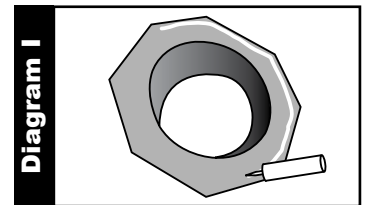
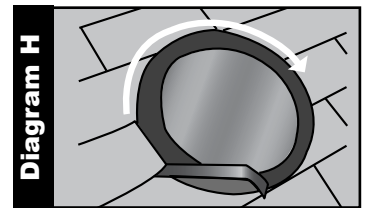
**Step 13:** Add 4 in (100 mm) to length from step 9. This accounts for the overlap of the extension tubes into bottom and top tubes. With this measurement, determine the amount of extension tubing needed.

Extension tubes have both deep and shallow notches at each end so that they may be formed into tapered tubes (**Diagram O**). Weave opposite side of tube through one deep notch, center notch and one shallow notch, then tape tube seam.\*\* Smaller end of tube is always oriented down.

Bottom tube fits into top tube on short installations. Tubes slide into each other for shorter lengths, but may be cut to length if necessary. **Remove protective liner** from extension tube before assembly.

\*For HVHZ, dip half the length of dome screw in roof sealant.

\*\*Apply pressure to tape for proper bonding.



**Step 14:** Telescope the extension tubes together with a minimum 1 1/2 in (40 mm) overlap at each joint. Firmly apply foil tape around each tube joint.\*\* Unscrew bottom tube assembly from ceiling and **remove protective liner** from tube interior. Insert small end of the extension tube assembly into the bottom tube with a minimum 1 1/2 in (40 mm) overlap. Align the tubes so they enter straight into the bottom tube. **(Diagram P)**. All overlapping tube joints need to be fastened with two tube screws. Tube screws are not required on vertical seam of extension tube.

**Note:** If cleaning the tube is required, use only a soft, lint free cloth and mild soap. Rinse with moist cloth and dry. Cleaners with ammonia will damage reflective tubing.

### BOTTOM ASSEMBLY/EXTENSION TUBE INSTALLATION

**Step 15:** To check fit, insert bottom/extension tube assembly up into the ceiling hole. If necessary, rotate bottom tube angle adapter to make top of assembly fit into top tube and ceiling ring to fit flush to the ceiling. Mark ceiling ring and ceiling for future alignment reference **(Diagram Q)**.

**Step 16:** Tape the bottom tube angle adapter and tube rivet seams.\*\* Apply expansion joint seal 1/4 in (6 mm) from upper end of top extension tube. Expansion joint seal should lap approximately twice around tube to seal out bugs and dust **(Diagram R)**.

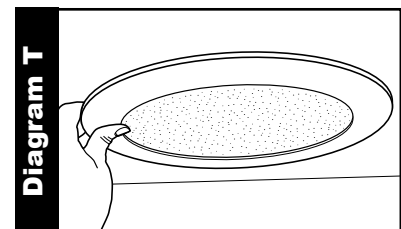
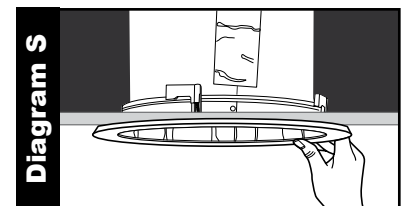
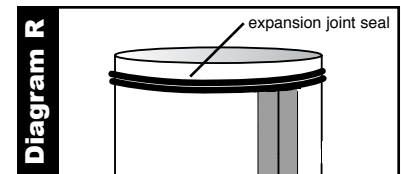
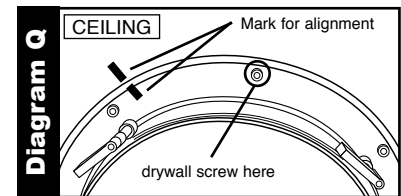
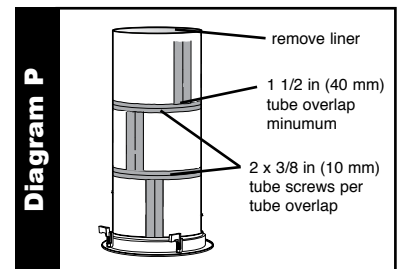
**Step 17:** Insert the assembly up into hole and line up corresponding marks on ceiling. Push assembly into top tube until ceiling ring flange is flush with ceiling. Rotate and tighten the four ceiling ring fastening clamps until flush with the ceiling. **Do not over tighten (Diagram S)**. If ceiling ring fastening clamps cannot engage drywall, use 1 5/8 in (40 mm) drywall screws in the countersunk screw holes of the ceiling ring in place of the fastening clamps. Use four 1 5/8 in (40 mm) drywall screws in the countersunk screw holes between the fastening clamps to align the ceiling ring flush with the ceiling **(Diagram Q)**.

**Note:** Do not overtighten ceiling ring to ceiling or the diffuser may not be able to be installed.

### DIFFUSER INSTALLATION

**Step 19:** Snap diffuser onto the perimeter edge of the ceiling ring **(Diagram T)**. You can now enjoy the benefits of your Solatube Daylighting System and the high performance, natural lighting it provides.

\*\*Apply pressure to tape for proper bonding.



# Climate Control Options

## Addendum to parts list

	QTY
1. 160 DS or 290 DS Natural Effect Lens for Climate Control (optional)	1
2. 160 DS or 290 DS Severe Climate Glazing (optional)	1

## Additional required materials

1. Foil tape

### NATURAL EFFECT LENS FOR CLIMATE CONTROL

**Step 1.** Place the lens with the seal on the bottom tube assembly ensuring the seal fits between the edge of the tube and the ceiling ring and the seal is flush with the ceiling ring. **(Diagram A, B)**

Continue with Diffuser Installation instructions in step 19.

**Note:** Remove the original Effect Lens from the diffuser before installing the diffuser.

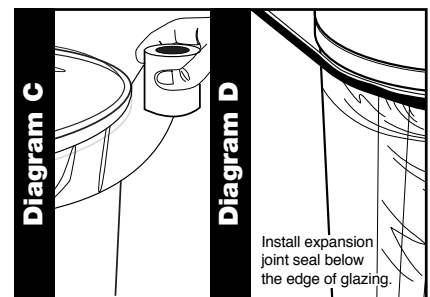
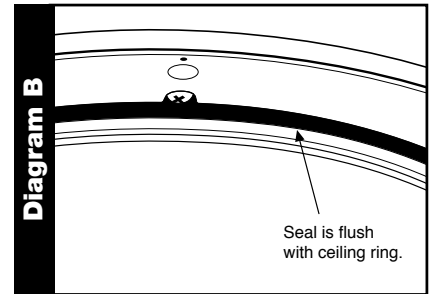
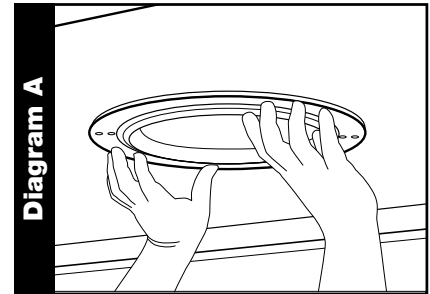
### SEVERE CLIMATE GLAZING

**Step 1.** Place the glazing on top of the tube assembly. The outer edge of the lens should be on the outside of the tube. **(Diagram C)**

**Step 4.** Tape the lens to the top of the tube assembly using foil tape. **(Diagram C)**

**Step 3.** Apply the expansion joint seal below the edge of the Severe Climate Glazing. The expansion joint seal should lap approximately twice around the tube to seal out bugs and dust. **(Diagram D)**

Continue with Bottom Assembly/Extension Tube Installation instructions in step 17.



# Curb Mounted Flashing Installation Instructions

## Addendum to parts list

	QTY
1. 290 DS (14 in/350 mm) Curb Mounted Flashing	1

Complete Brighten Up Series standard installation instructions steps 1-4.

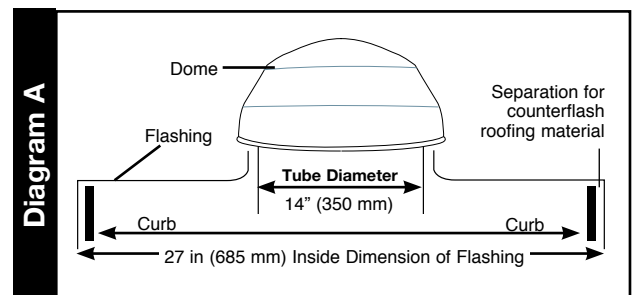
**Step 1:** Center curb mounted flashing onto constructed or manufactured curb. Check that flashing fits and that there are no obstructions in the way of tube's path **(Diagram A)**.

Note: Flashing inside dimensions are 27 in x 27 in. Allow space between flashing and curb to counterflash roofing material.

**Step 2:** Run 1/4 in (6 mm) bead of roof sealant on top of curb where it will make contact with bottom of flashing.

**Step 3:** Prior to inserting top tube into flashing, fasten flashing to curb with eight 2 in (50 mm) flashing screws\* through sides of flashing. Do not overtighten screws.

\*Note: For High Velocity Hurricane Zones, apply 12 screws evenly spaced around the flashing perimeter.



# Solatube® Universal Tile Flashing Installation Instructions (with base flashing)

## Addendum to parts list

	QTY
1. Tile flashing (Pitched or No Pitch version)	1
2. Aluminum "L" bracket	4
3. #8 x 1/4 in (6 mm) screws	8

## Additional required materials

1. Base flashing (Pitched or No-Pitch version)*	1
2. Roofing sealant	1 (10 oz)
3. Flashing screws - #10 x 2 in (50 mm) screws*	8

\*Provided with Solatube Daylighting System

Complete Brighten Up Series standard installation instructions steps 1-4. Do not use Portland-Cement based mastic, grout, or alkaline materials with this product. Caustic alkalis present in fresh, unhardened mortar will attack aluminum.

**Step 1:** Take tile and base flashings, top tube assembly, foil tape, dome, flashing screws, dome ring screws, LightTracker Reflector, roof sealant and required tools onto roof.

**Step 2:** Find roof opening location and remove enough tile to place base flashing on roof deck. (Using flashing as a template; mark inside circumference of turret onto roof deck.) **(Diagram A).**

**Step 3:** Cut through roof deck approximately 1/2 in (15 mm) outside the line and clean roof surface using course brush.

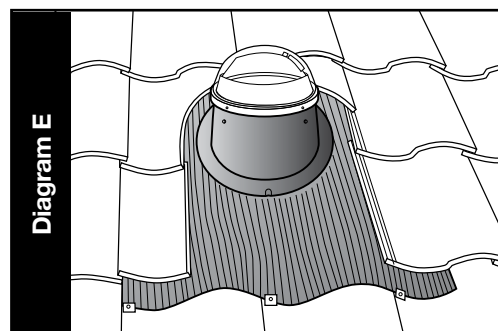
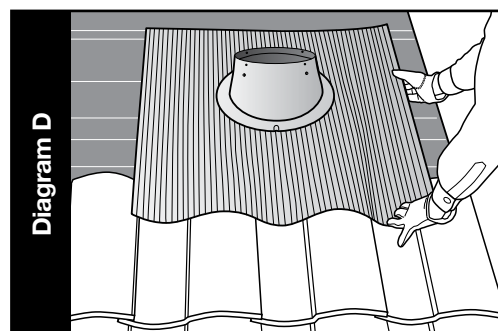
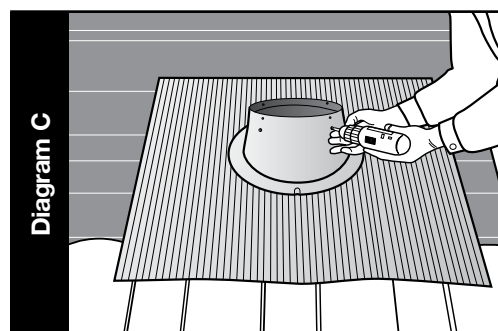
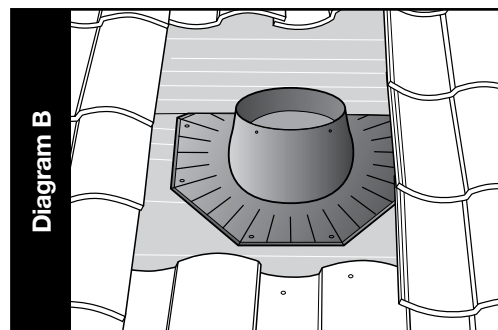
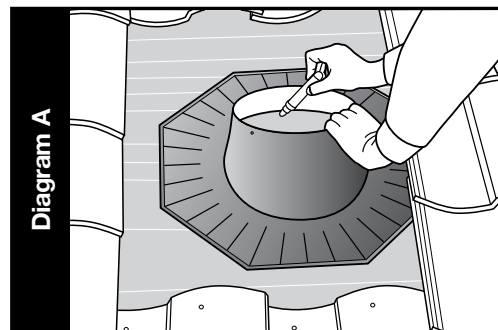
**Step 4:** Apply roof sealant to the underside perimeter of the base flashing under the roof underlayment, center over hole and fasten to the roof with 8 - #10 x 2 in (50 mm) flashing screws **(Diagram B).**

**Step 5:** Place tile flashing over the base flashing and align with tiles on roof. Locate the holes on the base flashing turret and drill 4 - 1/8 in (3 mm) holes in the tile flashing in the same location. Attach the two flashings with 4 - #8 x 1/4 in (6 mm) screws. **(Diagram C).** Seal screw heads with sealant.

**Step 6:** Apply hand pressure to form the lower end of the flashing to fit over the shape of profiled tiles. Bend both sides of the flashing up to divert water and prevent birds from nesting under the tiles **(Diagram D).**

**Step 7:** Apply aluminum "L" brackets to secure exposed lower end of flashing to tiles. Refer to instructions with brackets. Replace and secure the tiles removed at the side and back of the flashing. Apply sealant to prevent water penetration through flashing. Use only approved adhesive to secure tiles **(Diagram E).**

Return to **Step 9** of the **Brighten Up Series** standard installation instructions to complete installation.



# Spectralight® Infinity 0-90 Degree Extension Tube

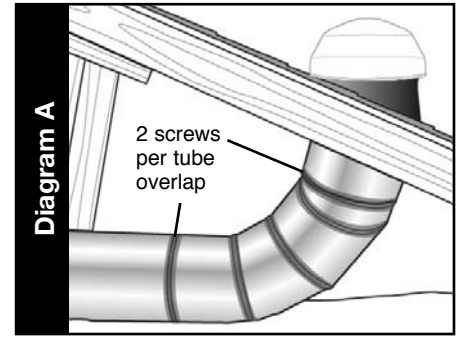
## Addendum to parts list

	QTY
1. 160 DS (10 in/250 mm) or 290 DS (14 in/350 mm) 0-90 degree extension tube	1
2. 8 x 3/8 in (10 mm) screws	4
3. 2 in (50 mm) foil tape - 6 ft. (1.8 m) roll	4

Note: This procedure is for Solatube installations where the roof to ceiling locations exceed 30° or an obstruction is in the path of a tube. A 0-90 degree extension tube should only be installed between the top tube and extension tubes or two extension tubes.

**Step 1:** Adjust the 0-90 degree extension tube to correct angle. If installing between the top tube and extension tube, insert one end into the inside of the top tube and the outside of the extension tube. If installing between extension tubes, insert both ends outside of the extension tube. The extension tube should be assembled with the smaller diameter on both ends. Overlap tubes 1 1/2 in (40 mm) at all intersections.

**Step 2:** Install 2 3/8 in (10 mm) screws at each tube intersection and firmly apply foil tape around each tube joint and tube intersection (**Diagram A**). Apply pressure to tape for proper bonding.



# Solatube Turret Extension

## Addendum to parts list

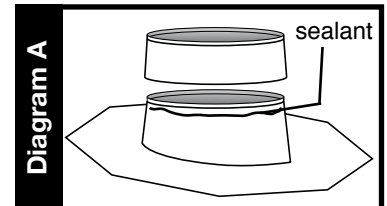
	QTY
1. 2 in (50 mm) or 4 in (100 mm) turret extension	1
2. 1/4 in (6 mm) screws	4

## Additional required materials

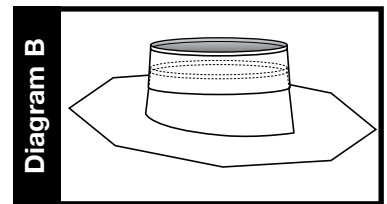
1. Roof Sealant

Note: This procedure is for Solatube installations where additional turret height is needed on roof installation. Complete steps 1-8 of the standard instructions.

**Step 1:** Apply a bead of roof sealant around the outside of the flashing turret and the inside of the turret extension. Place the turret extension over the turret and push down until the inside of the turret extension contacts the top of the flashing turret. Ensure that the sealant makes a water tight seal and remove any excess sealant inside and outside the turret (**Diagram A**).



**Step 2:** Align the predrilled holes in the turret extension and the flashing. Fasten the turret extension to the flashing turret with four 1/4 in (6 mm) screws. Seal heads of screws with sealant (**Diagram B**).



This completes the flashing portion of the installation. Please proceed to step 9 of the standard instructions to complete the installation.

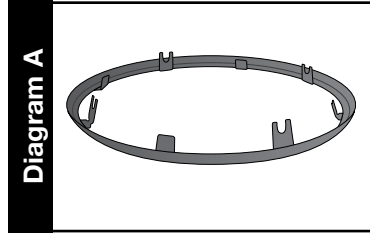


# Solatube Dome Edge Protection Band

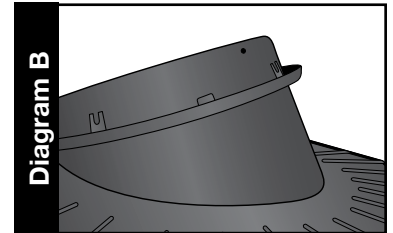
## Addendum to parts list

	QTY
1. 160 DS (10 in/250 mm) or 290 DS (14 in/350 mm) Dome Edge Protection band required for fire-rated roofs	1

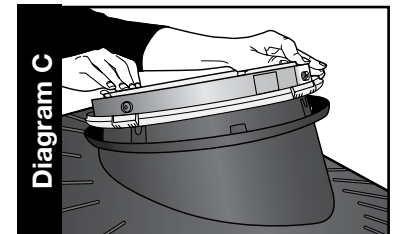
**Step 1:** Bend up each of the tabs so they are at an angle slightly less than 90 degrees (**Diagram A**).



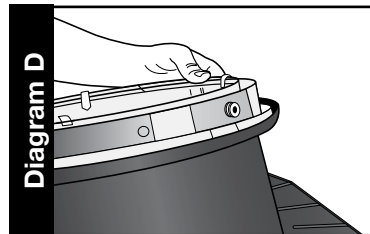
**Step 2:** Prior to installing the top tube of the Solatube Daylighting System, place the dome edge protection band over the flashing (**Diagram B**).



**Step 3:** Install top tube and fasten to the flashing according to the Brighten Up Series Installation Instruction steps 9-10 (**Diagram C**).



**Step 4:** Line up the notched tabs of the dome edge protection band with the dome ring spacers. Pull the dome edge protection band up so that the notched tabs snap onto the dome ring spacers (**Diagram D**).



Continue with the Dome Installation instructions in Step 12.

# Solatube Flat Roof

## FLASHING/NO PITCH FLASHING

### Complete Steps 1-4 of Brighten Up Standard Installation Instructions.

For 160 DS (10 in/250 mm) add 7 flashing screws (15 total) to addendum to parts list.

For 290 DS (14 in/350 mm) add 12 flashing screws (20 total) to addendum to parts list.

Note: Flat roof instructions are for built-up, cap sheet or roll roof systems. Installation is not recommended until talking with your roofing contractor on foam or torchdown roofs, due to warranty issues.

## PREP FLASHING

**Step 1:** Drill 3/16 in (5 mm) holes in the flashing, 4 in (100 mm) apart and 1 in (25 mm) in from around the edge of the flashing (**Diagram B**).

## PREP ROOF SURFACE

**Step 2.** Find the location of the nail/screw through the roof. Sweep away loose gravel from roof area where flashing will be located. If the roof is capsheet or roll roofing, simply remove any dirt or any loose granules with a wire brush. If the roof is hot tar and gravel, scrape away the embedded gravel and excess tar with a flat or spud bar. The roof surface under the flashing and 3 in (75 mm) beyond the edge must be smooth, level and clean.

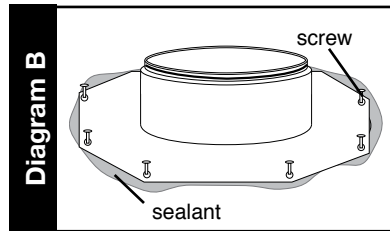
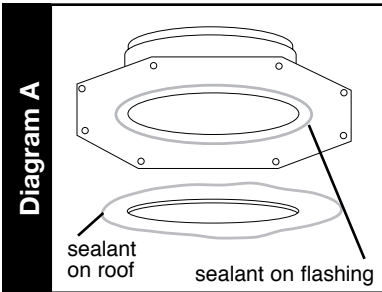
## CUTTING THE ROOF HOLE

**Step 3:** Center the flashing over the locating nail/screw and trace the inside circumference onto the roof surface with a lumber crayon. Cut the hole through the roof deck 3/4 in (20 mm) inside the marked line. Clean the sawdust from around the roof hole.

## INSTALL FLASHING

**Step 4:** Center the flashing on the roof hole and trace the outer edge of the flashing onto the roof to mark the proper location of the flashing. Remove the flashing and apply a 3/4 in (20 mm) bead of sealant to the roof, 1 in (25 mm) inside the perimeter of the mark. Also apply a 3/4 in (20 mm) bead of sealant on the underside of the flashing, 1 in (25 mm) in from the outside edge. NOTE: Apply sealant between old layers of pre-existing roofing exposed by cutting hole through roof (**Diagram A**). Lower the flashing into its marked position and make sure that it is seated correctly and the sealant has made a proper seal. Fasten the flashing to the roof with 2 in (50 mm) flashing screws. Screws should be firm, but not too tight (**Diagram B**). Apply another bead of sealant to the outer edge of the flashing, spreading it evenly to seal the flashing edge and the roof surface, use sealant on all flashing screw heads. If the roof is a gravel roof, sweep gravel back over the base of the flashing.

This completes the roof portion of the installation. Please proceed to step 9-21 of the standard instructions to complete the installation.



## Optional 160 DS Cement Tile Flashing Kit

### Addendum to parts list

1. Cement tile flashing kit
2. 9/16 in (14 mm) screws

### QTY

2

### Additional required materials

1. Masonry saw

Complete Steps 1-4 of Brighten Up® Series standard installation instructions.

### ROOF LOCATION

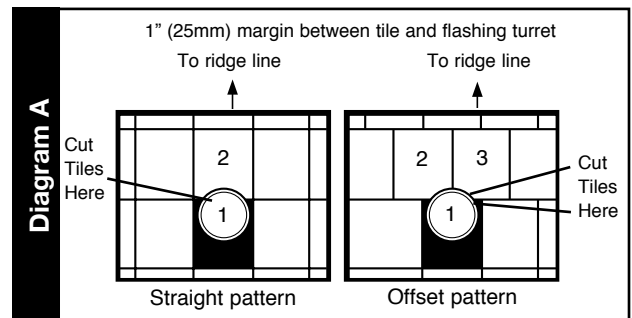
**Step 1:** Take tile flashing, base flashing, roof sealant, top tube assembly, dome, LightTracker™ Reflector, flashing screws, dome ring screws and stainless steel wire ties onto roof.

**Step 2:** Make sure proposed roof location provides clearance from framing and that it corresponds with the center of a tile. Adjust location if necessary. Make sure there is at least 16 in (400 mm) from flashing perimeter to ridge, (1) tile distance to hip or roof edge, and (2) tiles distance from other flashings or valley.

**Step 3:** Use distances recorded in attic to verify replacement of tile with flashing allows clearance from attic framing members at adjusted location. If clearance is insufficient, move to nearest tile providing clearance without causing tube to incline north. Seal original hole bored through felt paper.

**Step 4:** Provide clearance for flashing turret within field of tiles. Determine tile pattern (**Diagram A**). Put flashing in place over located tile. Align front edge of flashing with tiles.

**Step 5:** Using a crayon, trace inside perimeter of turret onto tiles. With a masonry blade, cut tiles 1 in (25 mm) outside marked line (**Diagram A**). Trace and cut profile of roof tile onto front skirt of flashing with tin snips. Ensure a closely



fitted front profile. This allows sides of flashing to fit flush with adjoining surface (**Diagram B**). Depending upon thickness of tile, trim “stand-off” lugs and back feet under flashing for flush installation.

Note: To avoid damming water, place sealant on crests, not in tile troughs.

**Step 6:** Put tile flashing in place of removed roof tile. Using a lumber crayon, trace perimeter of flashing turret onto felt paper. Cut a 12 in (310 mm) hole, inside the outline of turret, through roof sheathing (**Diagram B**).

**Step 7:** Set aside tile flashing and (1) tile on each side and (2 or 3) tiles below.

NOTE: If necessary, clean surface of felt paper contacting base flashing. Use a coarse brush and mild solvent, such as alcohol. Do not damage surface.

**Step 8:** Place base flashing over roof hole. If felt paper overlap intersects flashing hole, slip upper half of base flashing flange under paper so the lower half of flange sits on top of paper. Seal flashing and paper overlaps with 1/4 in (6 mm) thick bead of roof sealant. [NOTE: If there is no overlap, apply 1/4 in (6 mm) thick bead of roof sealant to bottom of flashing flange. Place entire flange on top of paper.] Temporarily cover flashing flange with tile and tile flashing. Align weather edges of flashing. Align both turrets for unobstructed insertion of top tube through flashings.

**Step 9:** Without disturbing base flashing location, remove tiles to expose lower flange of base flashing. Secure dome flashing location by screwing two flashing screws spaced 4 in (100 mm) apart and 1 in (25 mm) from flashing outer edge (**Diagram C**).

Remove surrounding tiles and complete securing flashing in place with flashing screws placed 4 in (102 mm) apart and 1 in (25 mm) from outer edge. Be sure to seal all screw heads and old fastening holes with sealant.

## FLASHING FASTENING

**Step 10:** Replace tiles and tile flashing. Lift uphill tiles, slip flashing into place. Align with base flashing and front apron with leading edge of tiles. Fasten the flashing to the base flashing. Drive two 9/16 in (14 mm) screws through the front of tile flashing turret spaced 5 in (125 mm) apart threading into the top of base flashing turret, 3/4 in (19 mm) from its top. Seal heads of screws with sealant (**Diagram D**).

Note: Secure each course of tile with fastenings driven through a spot of sealant. If tile fastening hole is covered by upper course of tiles, secure tile in place with heavy spot of sealant sandwiched between tile courses or a proper tile clip.

This completes the flashing portion of the installation. Please proceed to step 9 of the standard instructions to complete the installation.

