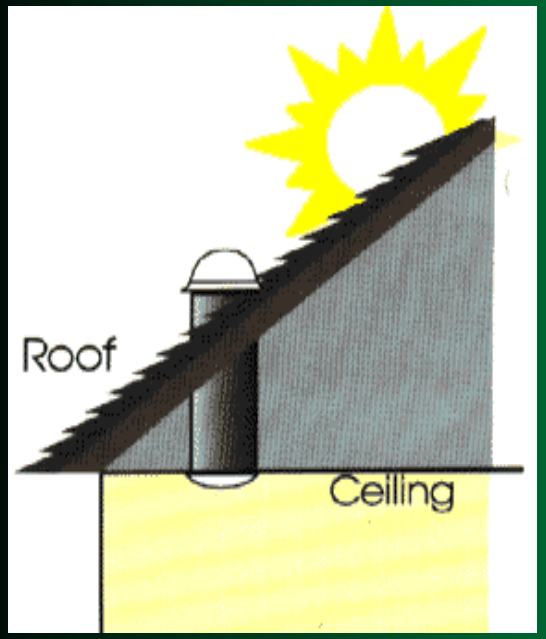
SKYLIGHTS

LET THE SUNSHINE IN



Skylights Offer a Great Option for Light and Ventilation

Adding a skylight is one of the quickest and easiest ways to make any room of your home lighter and brighter, adding an open and airy feeling. There are two basic types of skylights for residential use – flat glass and domed acrylic – and each have some advantages.

Domed acrylic skylights are less expensive than glass, and their convex shape tends to let the rain wash accumulated dust and dirt off a little easier. The acrylic dome is mounted in an aluminum frame, which is in turn mounted on a 2x6 box called a "curb." Once the hole is cut in the roof to the manufacturer’s specifications, the curb is constructed on-site to raise the skylight above the level of the roof sheathing. Site-built or factory-supplied flashings are used to seal the roofing around the curb.

Domed skylights are available in clear, smoked, bronze or other tints. Most are double- or triple-glazed in order to achieve the level of energy efficiency required by the building codes. Several sizes are available, with the most common being 2x2, 2x4 and 4x4 feet.

Flat glass skylights come mounted in a wood or integrated rubber and metal framework, and require no additional curb construction. After the hole is cut, the skylight frame is simply attached to the roof sheathing with L-brackets, then the installation is completed using the factory-supplied flashing kit. Easy installation, superior insulating qualities, less tendency to scratch and a cleaner finished appearance all add to the popularity and somewhat higher cost of glass skylights.

Glass skylights also have a greater number of optional accessories. These include tempered, laminated or wire glass; shades and blinds for light control; glass tints for heat retention or to block sunlight; and the ability to open fully or partially for ventilation. At least one company, Velux – a leading manufacturer of quality glass skylights that are available at most local home centers and lumber yards – even offers an electric motor coupled to a rain sensor that automatically shuts the skylight if it detects rain.

Light Shafts

If the room you intend to illuminate with the skylight has an open ceiling with no attic space above, you can install the skylight without needing to construct a light shaft. This is by far the simplest installation, and it offers the maximum amount of light and a view of the sky. Operable units are usually recommended, especially for a second-floor room, since these direct skylights can add a considerable amount of heat to the room on a summer day.

For ceilings with an attic space above, a light shaft must be constructed that connects the skylight to the room. Skylight shafts take one of three forms:

1. Straight, in which the shaft drops vertically from the roof to the ceiling and is the same dimension as the skylight itself. This type is the easiest to construct, but because of its offset angle relative to the skylight, offers the least amount of light.

2. Angled, where the shaft is parallel to the pitch of the skylight. It, too, is the same dimension as the skylight, but its straight-in angle offers more light than a straight shaft. Angled shafts also are used to connect two locations that cannot otherwise be aligned. This occurs when the skylight must be installed in a particular spot - between two trusses, for example - and the shaft opening is likewise limited to a particular location on the ceiling that is not directly under the skylight.

3. Splayed, or pyramid, in which the ceiling opening is larger than the skylight opening in width, length or both. This type, although a little harder to construct, is the most popular, simply because it allows a smaller skylight to illuminate a larger area.

After the skylight is installed, you'll need to position and mark the opening on the ceiling. Take into consideration the size of the room and the amount of light you wish to bring in, and select the size and position of the hole accordingly.

Once the skylight is installed and the ceiling hole is cut, it's then a matter of connecting the two with the shaft, which is constructed from 2x4 or 2x6 lumber. The angles involved typically require some tricky framing, and is probably best left to an experienced carpenter.

After the framing is completed, the inside of the shaft is covered with wood or drywall, and the attic side is insulated to at least R-21 to minimize heat loss. To reflect an even greater amount of light into the room, consider painting the inside of the shaft with gloss or semi-gloss white paint.

Skylights or Windows?

Skylights and windows are often mentioned in the same breath as a fix for dark rooms, as if poking a big hole someplace is all that really matters.

Yet these aren't interchangeable solutions for the same problem. Skylights and windows have very different daylighting characteristics, as well as a radically different aesthetic both inside and outside. A closer look may help you make the right choice for your home.

First, a rundown of basic differences: A window is placed vertically in a wall, while a skylight is mounted parallel to the roof plane or else raised above it on an extension known as a "curb."

While windows are almost invariably fitted with glass, the majority of modern skylights are glazed with acrylic or polycarbonate plastic in tints ranging from clear to translucent white to a dark smoked color. One exception is the so-called roof window, which is a type of flat skylight glazed with glass and usually arranged to open.

In terms of solar efficiency, a well-oriented window will generally be better attuned to seasonal changes than a skylight. Since window openings are vertical, they admit more of the low-angled sun in winter when it's most welcome, while blocking much of the high-angled summer sun to prevent excessive heat gain. In fact, with the proper external shading, a window can be "fine-tuned" to admit full sun on the shortest days of winter, yet be completely shaded on long summer days.

Your typical low-pitched skylight, alas, has just the opposite trait: In winter, when the sun is low, it cuts off a great deal of desirable sunlight, while in summer, it lets the high-angled sun come blasting in, potentially overheating rooms. Using tinted glazing and deep, light-diffusing wells can help to compensate for this shortcoming, though neither is really a remedy.

Despite these shortcomings, skylights produce a kind of top-lit architectural drama that windows often can't match. Moreover, dollar-for-dollar, they'll usually bring in more light than windows. So which is right for your home?

If the object is simply to brighten a room for the least expense, or to provide some dramatic toplighting, a skylight will do the trick. On the other hand, if you'd like to fine-tune a room to be brighter and warmer in winter while keeping it cooler in the summer, a new or enlarged window or glass door may be a better choice.

Aesthetically, deciding between windows and skylights is more clear-cut. Today's ubiquitous plastic bubble skylights weren't in general use until the early 1960s; hence, they invariably look "wrong" on earlier homes, and should be a last resort. If you have a home predating the 60s and still have your heart set on using some form of skylight, consider using roof windows, which have a lower profile, and place them where they won't be visible from the street. Better yet, challenge yourself by adding light the way the era's architects would have—with a generous, well-placed window or set of glass doors.

If your home postdates the 1950s, a carefully-placed skylight will probably blend in reasonably well with the overall style. Still, for the sake of a clean front elevation, you should avoid installing skylights on roof surfaces that face the street. Note that a few generous skylights are better than a lot of small ones, both in ease of construction and in the daylight you gain per dollar. And of course, consider the orientation of the units before you install them, so you'll have some idea of their daylighting value—or lack of it.

Adding a skylight is one of the quickest and easiest ways to make any room of your home lighter and brighter, adding an open and airy feeling. Skylights produce a kind of top-lit architectural drama that windows often can't match. Moreover, dollar-for-dollar, they'll usually bring in more light than windows. Installing a skylight in a room that has a finished ceiling with an attic or crawl space above it involves planning both a ceiling opening and a roof opening.My skylight section takes you step-by-step through how to install a skylight. Plus some useful information on the efficency of skylights.

- How to Install a Skylight – Introduction
- How to Install a Skylight - Safety on the Roof
- How to Install a Skylight - Preparing the Openings
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- How to Install a Skylight - Building the Light Shaft
- How to Install a Skylight - Tools and Materials Checklist

Introduction:

If you're considering installing a skylight, be sure to read the following pages very carefully to learn what's involved. Penetrating roofing materials and framing the opening below can be difficult and demanding, even for experts. Once you understand the processes and the pitfalls of installing a skylight, you'll be able to decide whether this is work for you or a professional.

Safety on the Roof:

General Consideration and Tips

Keep these tips in mind every time approach the roof.

1. Wear loose, comfortable clothing, rubber-soled shoes with good ankle support, and a hat for sun protection.
2. Work on the roof only in dry, calm, mild weather A ladder or roof that's wet from rain, frost, or dew can be treacherously slick, and a sudden wind can knock you off balance. Keep grass cuttings and mud off your shoes, as well. Never get on the roof when lightning threatens.
3. Once on the roof, be alert for slippery, brittle, or old roofing materials, and rotten decking you could put a foot through.
4. Avoid contact with power lines connected to the house and with television antennas.

5. To avoid straining your back, lift only lightweight loads and let your leg muscles do the work.
6. Pace yourself and take frequent rests.
7. Keep children and pets off the roof and away from the work area; they can be hurt by falling materials.
8. Metal ladder brackets allow you to hook a ladder over the ridge of a house.
9. Toe board jacks nailed to the roof support you and your materials with a 2 by 6 plank. (Use strong, straight-grained lumber no longer than 10 feet unless you support the middle with another jack.) The jacks have notches in them so they can be slipped off the nails. Secure jacks with nails long enough to penetrate sheathing and rafters.
10. An angled seat board allows you to sit on a level surface while working. Angles on the sides of the board must match the slope of your roof.
11. Scaffolding, useful if you're installing a large skylight, can be rented from tool supply companies

Safety Procedures

The standard safety devices illustrated are available from tool rental companies.

Ladders

Inspect your ladder for cracks or weaknesses in the rungs before you lean it against the house. The ladder should be long enough so that at least two rungs extend above the eaves. Place the base of the ladder on firm, level ground at a measured distance from the side of the house-that distance should equal a quarter of the vertical distance from the ground to the top rung.

Get on and off by stepping onto the center of the rung; use both hands.

If the ladder is to stand on a slick surface, install rubber safety shoes (they're available at home improvement centers).

Preparing the Openings:

Installing a skylight in a room that has a finished ceiling with an attic or crawl space above it involves planning both a ceiling opening and a roof opening. On the other hand, we'll need to lay out only one opening if the area we're working in has an open beam ceiling.

Regardless of the type of construction, the size of the roof opening will be determined by the size of the skylight we're installing. Generally, the dimensions of the roof opening in a house with finished ceilings are the same as the inside dimensions of the skylight or of the curb if it's a curb-mounted unit.

Most manufacturers provide the necessary dimensions along with installation instructions. If a manufacturer gives the curb's outside dimensions, deduct twice the curb's thickness from the length and width to determine the size of the opening.

Contractors differ on the methods they use to determine the location of roof and ceiling openings in homes with attics or crawl spaces. Some contractors cut the opening in the ceiling before cutting the roof opening. Others cut the roof opening first, and this is the method described below; it allows to adjust to the conditions in home.

Planning and Marking the Ceiling Opening

Whether our desire is for moon-beams on our bed, diffused light for our art projects, or sunlight splashing across our dining room table, the location of our ceiling opening depends on where we want the light and what kind of light we need.

Even after we've identified the ideal location, we may want to make some adjustments if we discover some structural impediment when we explore our attic.

The size of the ceiling opening depends not only on the skylight's size, but also on the amount of light we want to bring in. The light enters the room through a light shaft, which can be straight, angled, or splayed.

An angled or splayed light shaft allows to offset the roof opening from the ceiling opening. If we want to maximize the amount of light coming into the room, make the ceiling opening larger than the roof opening and connect them with a splayed light shaft; we can splay any or all shaft walls.

After we've decided on the location and size of the ceiling opening, mark the four corners and the center of the proposed opening. Drive nails deeply enough through these five points so you can find them in the attic. If any of the nails hits solid wood, you may want to move the proposed opening or adjust its size to avoid the obstruction.

Planning and Marking the Roof-opening

Much of the work of installing the skylight is done from the attic or crawl space. If we don't have convenient access to our attic or our attic is not roomy enough to work in, we'll need to cut a hole big enough to climb through or work through (from a ladder or platform) within the proposed opening, at one side of the center. Then, after we've marked the center of the roof opening, we can cut the ceiling opening for access.
If your attic is insulated, wear clothing that will protect you against insulation material: gloves, a long-sleeved shirt, long pants, a painter's mask, and goggles.

Checking for Obstructions

Clear away any insulation material covering the area of proposed ceiling opening. Locate the nails that were driven through from the ceiling below. Look for obstructions-wires, pipes, or heating or cooling ducts-within the area of the proposed opening. If we find any and don't want to move or adjust the size of the opening, we'll have to move the obstruction.

To save our self work when framing the ceiling opening, try to arrange the opening so two opposite sides butt up against the facing sides of two joists.

Measuring the Opening

To locate the center of the roof opening, hang a plumb bob from the underside of the roof with the point of the bob over the center nail in the ceiling opening. Mark this point clearly on the underside of the roof.
With tape, square, and straightedge, mark the manufacturer's recommended dimensions for the roof opening on the underside of the roof.
we can simplify the framing of the opening by locating at least one edge (preferably two) against a rafter.
Check the area of the roof opening for obstructions. If find wires, pipes, or heating or cooling ducts, we can either move the opening or move the obstruction. If the roof ridge or a purlin (a structural member positioned at right angles to the rafters) crosses the opening, we'll have to relocate the opening and use an angled or splayed light shaft between the roof and the ceiling.

Marking the Corners

we'll want to be able to find the corners of the opening when we go up on the roof. Drill a hole at each corner and drive a 16-penny nail (20-penny for a shake roof) through each hole.

Opening the Roof

The thought of cutting a hole in our roof needn't conjure up images of dripping water destroying your living room carpet, as long as we know how to seal that opening against the vagaries of nature. And speaking of nature, do the roof work on a day with zero rain probability, and plan on having the skylight installed by the end of the day. Even then, we'd be wise to have a tarp handy, just in case.

Walk very carefully on the roof-the fewer shakes or shingles you disturb, the better. But put safety first. If roof is moderately sloping, secure a foot plank or ladder.

Building a Curb

Before begin cutting through the roof, we'll have to build a curb, or box frame, for our skylight if it's the curb-mounted type. we may find it convenient to assemble the curb on the roof. If our skylight boasts an integral curb, or is self-flashing and sits directly on the sheathing, we can avoid this step.

The curb should raise the skylight at least 4 inches above the roofing material. Usually 2 by 6 lumber works well for shingle, shake, and built-up roofs.

The inside dimensions of the curb should equal the dimensions specified by the manufacturer for the roof opening. Mark the lumber for cuts, taking care to keep knots away from the ends. Cut the pieces. As a further precaution against split ends, drill pilot holes for nails; then nail the pieces together.

Check the curb for squareness by measuring diagonally from corner to corner; the distances should be identical. Also use a framing square.

It's a good idea to brace two opposite corners of the curb to keep it square until ready to nail it in place. Make the braces from lengths of wood or cut triangles from 1/2-inch plywood. Nail in the braces with 6 or 8-penny common nails; drive the nails halfway down to remove them easily later on.

Marking the Roof

In a home with finished ceilings, mark the roof opening and the roofing material that needs to be removed in exactly the same manner for either a sloped or a flat roof. The amount of roofing material remove to allow for the flashing and water runoff varies, depending on the type of roofing and the kind of skylight to use.

For a Curb-mounted Skylight

Set the curb over the four nails protruding through the roof. If the curb is the right size, there'll be a nail in each inside corner.

For a wood or asphalt shingle roof, use chalk, pencil, or a utility knife to mark lines on the roof along the outside edges of the sides of the curb. Extend the lines you just outlined 3 inches beyond the top and bottom corners of the curb. Mark a line between these points and parallel to the top and bottom of the curb. This is the area from which remove the roofing material.

If have a heavy shake roof, mark lines on the roof 1/2 inch away from the outside edges of the sides of the curb; extend those lines 3 inches to the top and bottom, and connect them in the manner described above.

After marked the lines, set the curb aside.

For a Self-flashing Skylight

Make measurements from the sides of the proposed roof opening marked by the four nails. Mark lines approximately 10 inches beyond the nails on the top and the two side, and 2 inches below the nails on the bottom.

On a flat roof (hot-mopped asphalt or foam), mark lines 10 inches beyond the nails on all four sides. Remove the gravel first.

Cutting through Roofing Materials

Though use hand tools to cut through a roof, a circular saw or a reciprocating saw is easier and faster. A combination blade is best for cutting through wood shingles or shakes. It find that a utility knife works better than a circular saw to cut through asphalt shingles.

Use safety precautions when working with any power tool: make sure the equipment is properly grounded, wear goggles or safety glasses, avoid awkward positions, and keep out of the line of the blade. Be alert while sawing-a blade that binds can throw you off the roof.

To cut through shingles or shakes for a curb mounted skylight or through built-up roofing for a self-flashing skylight, adjust the depth of cut on saw so the blade cuts through the roofing material, but not through the wood sheathing underneath. Resting the front of the saw's sole plate on the roof, align the saw blade with the chalk or pencil mark or the knife cut.

Turn on the power and lower the saw until the sole is resting on the roof. Saw slowly and steadily along the marked line until reach a corner. Repeat for the other sides.

After cut around the opening, pry the roofing materials loose with a crowbar and hammer; save asphalt shingles to use for patching around the skylight. Peel off the roofing felt to expose the sheathing.

Determining Framing Requirements

To determine the framing needed for the opening, carefully examine the structure of the roof around skylight opening. If skylight fits exactly between two rafters, need single headers, framing members running perpendicular to the rafters that support the sheathing. If it fits exactly between the rafters on either side of an opening spanning one or more rafters, need double headers to support the sheathing and the cut rafters.

Skylights smaller than the space between the rafters require an opening framed with both headers and jack rafters, framing members running parallel to the rafters between the headers: one jack rafter if the opening abuts one rafter, two if it does not. Lumber used for headers and jack rafters should be the same size as the rafters. Be sure framing will meet all local codes.

Cutting the Sheathing

Stretch the chalk line around the nails that were pushed through the roof, and snap the line between each pair of nails to mark the finished roof opening.

Mark another set of lines in the sheathing around these and parallel to them, depending on your framing requirements: mark a line at right angles to the rafters at both ends of the finished opening-1-1/2 inches away for a single header, and 3 inches away for a double one if using 1-1/2 inch-thick lumber. If installing jack rafters, mark lines parallel to the rafters 1-1/2 inches away from both sides of the finished opening.

Pull out any nails within 4 inches of the edges of the proposed opening. This avoids damaging the blades of saw.

With a combination blade in saw, set the depth of cut just to cut through the sheathing. Cut along the larger outline on the sheathing as described above.

Cutting the Rafters

Though rafters crossing the roof opening can be left in place, may want to remove them for an unobstructed view of the sky. It then have to install double headers.

To remove a rafter, use a combination square to mark lines on the rafter to be cut and the rafters on both sides of the opening at a right angle to the cut edge of the roof sheathing; if the light shaft will be splayed or angled, mark the lines at the desired angle. The lines on the rafters on the sides of the opening indicate the placement of the headers.

The angle at which secure the headers to the rafters depends on the angle of the light shaft of building.

Whether or not cut through any rafters, It need to frame the roof opening with headers and possibly jack rafters so the sheathing is supported on all four sides.

Installing Double Headers

After marked the angles of the headers, measure the distance between the rafters, cut four pieces to the length measured.

To secure the headers to the rafters, nail double joist hangers to the rafters using special hanger nails; make sure that the bottom of each hanger is aligned with the bottom of the rafter, and the outer side of the unshaped support is aligned with the line marking the header position.

If the header is not perpendicular to the top of the rafter, it may have to cut away any part of the hanger that protrudes above the header. Or use framing anchors instead of joist hangers.

Place a header into each facing pair of hangers and nail it to the cut end of the rafter with 16-penny common nails. Put a second header into each pair of hangers and nail it to the first header with 8-penny nails; space the nails 6 inches apart and stagger them along the length of the piece. Nail the joist hanger flanges to the headers. Repeat on the opposite side of the opening.

Installing a Single Header

Follow the same procedure for measuring as described for double headers; cut two, rather than four, pieces.

Installation is similar to that for a double header; use only one header for each pair of single-size hangers.

Finishing the Framing

If roof opening doesn't fit exactly between rafters it need to install jack rafters between the headers parallel to the rafters. Cut lumber the same size as the rafters to fit between the two headers. Install and nail these pieces in joist hangers nailed to the headers. Cut some plywood the same thickness as the sheathing are removed so it fits on top of the headers and jack rafters, if used. Nail it to the headers with 8-penny common nails.

Installing and Flashing the Skylight

If installing a self-flashing skylight, now ready to position the skylight. But if skylight is a curb-mounted unit, need to flash the curb. The skylight might come with a flashing system, as shown in the video. Be sure to follow the manufacturer's instructions carefully. This is the most critical part of the skylight installations bad flashing job can result in a leaky roof.

Unless worked with sheet metal and have a propane torch or large soldering iron, want to have a sheet metal shop to make the flashing pieces.

If decide to make own flashings, use lead, it's easier to work with than copper or aluminum. With little effort, bend and solder lead and solder the joints between flashings for a long lasting, watertight seal. Make paper patterns of the flashings to fit the curb; form the pieces, and then solder the joints in the saddle and apron flashings.

Flashing a curb so it forms a watertight seal between the outside and inside of our home requires special care and thoroughness. If follow the instructions below, and any guidelines from the manufacturer of the skylight, we should be able to enjoy the raindrops dancing on your skylight, instead of dripping into your house.

Apron Flashing

Slide the saddle, or top flashing, underneath both shingles or shakes and the roofing felt. Remove any nails that keep us from sliding the saddle all the way up under the shingles. As we position the saddle, take care not to puncture the roofing felt, as this can cause leaks.

Set the curb over the roof opening, sliding it up from the bottom until it's perfectly aligned with the opening. Check the curb for squareness. Then, using 16-penny nails, toenail the curb through the sheathing to the frame (rafters and headers). Remove the corner braces from the curb.

Step Flashing

At the top of the sloping of the curb, place step flashing underneath each end of the flange on the roof. Remove the skylight and liberally cover the area within the lines with roofing cement.

Next, position the skylight over the opening, making sure all four corners are aligned with the corners of the roof opening. Press the flange firmly into the roofing cement and nail the flange to the roof with the roofing nails. Cover the nail heads and the flange with a generous amount of roofing cement.

If roof is surfaced with hot-mopped asphalt or with polyurethane foam, you may want a roofing contractor to restore roof. It can replace shingles or shakes; trim them as necessary to fit against the edge of the curb.

Opening the Ceiling

After secured the skylight, cut, frame and finish the ceiling opening any day, rain or shine. And can begin enjoying the light streaming in through skylight even before completed framing and finishing the hole in the ceiling.

Cutting the Ceiling

Since planned and marked the ceiling as the first step in installing skylight. cutting the opening is fairly straightforward.

Check Markings

Even though marking the corners and center of the ceiling opening before cutting through the roof, it's a good idea to double-check marking against both the framed roof opening and the angle of the light shaft.

Check the corner nails and replace any that are missing. Stretch chalk line around the four nails and snap the line between each pair of nails to mark the opening. Then remove the nails.

Marking the Cut

Before cut the opening, cover the floor and the furniture below with a large tarp and drop cloths. Wear a painter's mask and goggles to protect against the dust while cutting. Cut through wallboard (gypsum board) with either a keyhole or reciprocating saw. Cut lath and plaster with a reciprocating saw fitted with a coarse, wood-cutting blade.

When come to a joist, cut through only the wall board to prevent tearing when the ceiling cutout is removed. Ceiling material is quite heavy, so want to cut it out in small pieces if the area of the opening is larger than conveniently handle it.

After the opening is cut, break off the wallboard and remove the wallboard nails.

Cutting Ceiling Joists

Before cut the ceiling joists, it need to reroute any pipes, wiring or air-conditioning ducts that cross the ceiling opening, if weren't able to plan around them.

If have to cut one or more joists that are more than 30 inches from a wall it need to support them before cut. Using 2 by 4 lumber, cut two pieces long enough to span both the opening and two joists on each side of the opening. Position the pieces at least 12 inches from the edges of the opening, and fasten them with woodscrews to the joists. This will keep the joists from shaking and jiggling when cut through them, and will prevent nails in the wallboard from popping loose.

To cut joist, follow the instructions for cutting a roof rafter, with these additional guidelines: if it planning a straight light shaft, cut the joist at a right angle to the ceiling; mark the angle of cut for an angled or splayed shaft with a straightedge or a length of string positioned between the bottom of the joist and the roof opening. Be sure to allow for the headers by measuring out from the opening.

Framing the Ceiling Opening

Using joist-hanger nails, nail the hangers to the joists. Set one header into each facing pair of hangers and nail it to the cut end of the joist with 8-penny common nails. Fit the second header into each set of hangers and attach it to the first header with 16-penny common nails driven in a staggered pattern. Nail the joist hanger flanges to the headers. Repeat on the opposite side of the opening.

If ceiling opening doesn't fit exactly between two joists, need to install additional framing members parallel to the joists, along the edge of the opening.

Building the Light Shaft

The light shaft directs light from the skylight on the roof to the interior of home. The following pages describe how to frame, insulate, and finish a light shaft.

Framing the Light Shaft

The frame for the light shaft not only provides a nailing surface for the walls, but also joins the ceiling to the roof, giving support to both.

Measure the distance between the ceiling headers and the roof headers at every corner, and at least every 16 inches in between. Cut the vertical studs to the measured lengths.

Unless your roof is flat and your light shaft straight, you'll need to cut one or both ends of the studs at an angle.

If want lights in the shaft, position the studs to clear any electrical outlet or recessed light fixtures plan to install.

Toenail the studs to the ceiling and roof headers with 8-penny nails. Make sure to install two studs at each corner to provide nailing for the wallboard or other material used to finish the shaft

Insulating the Light Shaft

For better energy efficiency plan on insulating the light shaft. If attic is not insulated, may want to insulate it at the same time. Be sure to install any electrical wiring before you insulate.

Caution: Remember to wear gloves, a long-sleeved shirt, long pants, a painter's mask, and goggles when working with insulation.

Rolled insulation works best for the short, uneven lengths needed in a light shaft.

Buy 6-inch-thick insulation in the width that will best fit between the studs.

Measure a length of insulation to fit in each stud opening, and cut the insulation with a utility knife guided by a straightedge. Place the insulation between the studs with the vapor-barrier side toward the shaft opening; staple the edge flaps to the studs.

Finishing the Light Shaft

How finish the light shaft is limited only by imagination. Here are some ideas to get you started. Wallboard that is painted white or a light color is one of the best finishes for reflecting light. Finishing with wallboard and paint is economical, but takes time and skill for good results.

If walls are paneled, they may want to finish the light shaft to match.

Taking Care of Skylight

Once they're installed, skylights require only a minimum of maintenance and cleaning. Because of their shape, slope and location, heavy rains wash away most of the dirt. Occasionally, need to clean the inside - and the outside, too, if the rain doesn't do the job.

Caring for the Frame

Most skylight frames are made of aluminum (colored ones are anodized) and require no care other than washing when clean the skylight glazing. If we live by the ocean where the sail from the spray can eat into aluminum, it 'll have to protect the frame with paint. If skylight frame has a painted metal finish, check it annually, touching up any bare spots with a paint recommended by the manufacturer.

Protecting and Preserving Plastic

Acrylic and polycarbonate are the two types of plastic generally used in skylights. The cleaning and repair suggestions below apply to acrylic and, for the most part, to polycarbonate.

If skylight is made from fiberglass, follow the manufacturers' instructions for proper care of the glazing.

Cleaning Plastics

Plastic glazing is susceptible to scratches and abrasions, as well as to damage by certain solvents. we'll want to observe some general precautions when cleaning a plastic skylight:

Never use abrasive cleansers, abrasive pads, or gritty cloths.

Do not remove dirty by scraping with a sharp tool, such as a razor blade or putty knife.

Do not clean with window cleaning fluids or strong solvents such as gasoline, denatured alcohol, carbon tetrachloride, or acetone. They will cause the plastic to craze with minute cracks.

To clean a plastic skylight, use either a solution of mild soap or detergent and water or a weak solution of household ammonia and water (do not use ammonia for polycarbonates.) Apply a soft cloth or cellulose sponge and rinse well with clear water. To prevent water spots, blot dry with a chamois or a damp cellulose sponge.

To remove foreign material (protective paper, glazing compound, caulking, roofing tar, grease, or fresh oil paint) from acrylic, use hexane, a good grade of naphtha, kerosene, or methanol applied with a soft cloth. Use a good grade of naphtha, isopropyl alcohol, or butyl cellosolve on polycarbonate domes. Then clean the skylight as described above

Protecting Plastic

To maintain the luster of plastic, protect it with a thin, even coat of automobile polish (not cleaner polish) or floor or automobile wax applied with a clean, soft cloth. Buff lightly and wipe with a clean, damp cloth to remove static electricity, which attracts dirt.

Plastic Repair

we can minimize or remove minor scratches and abrasions from plastic, and often control cracks.

Minor scratches and abrasions can sometimes be obscured with automobile wax applied as described above. If this method doesn't work, try polishing the scratched area of the plastic with a good grade of automobile cleaner polish on a soft cloth. The fine abrasive in the cleaner polish will smooth the scratches, and the wax in the polish fills them, reducing their visibility.

Major scratches should be repaired by a knowledgeable professional.

Cracks can be kept from lengthening - drill a 1/8 inch diameter hole at each end of the crack and fill the holes with silicone sealant.

Looking after Glass

We can clean clear or coated glass either with commercial glass cleaning solutions or with a weak solution of household ammonia, mild soap, or detergent (if rinsed thoroughly) and water. Apply with a sponge and dry with paper towels, a chamois, or, if the glass is flat, a squeegee.

To prevent scratches, abrasions, and deterioration, never clean coated, sun-control glass with abrasive cleansers, gritty sponges, or metal objects such as razor blades or putty knives.

Tools and Materials Checklist

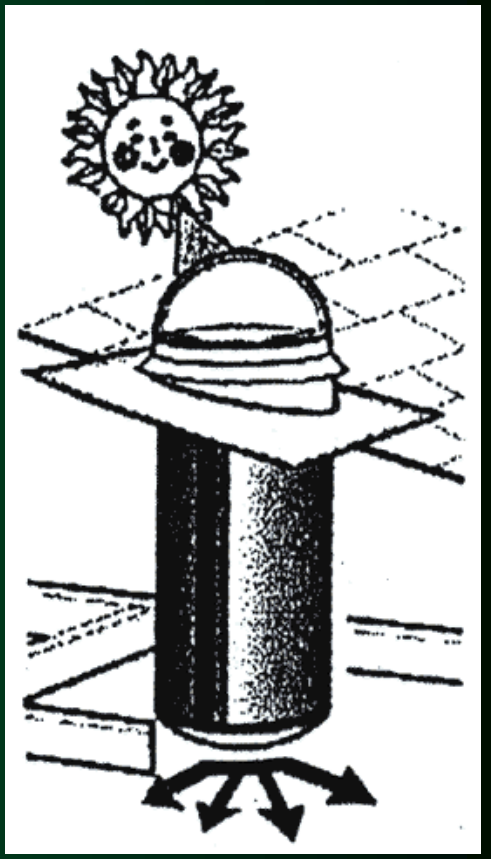
Tools:

1. Level
2. Square
3. Crowbar
4. Tin Snips
5. Drill Bits
6. Caulking Gun
7. Hammer
8. Nail set
9. Chisel
10. Utility Knife
11. Extension Cord
12. Goggles
13. Painter's Mask
14. Combination Square
15. Chalk line
16. Sliding T-bevel
17. Tape
18. Circular Saw
19. Reciprocating Saw
20. Keyhole Saw
21. Plumb Bob

Materials:

1. Skylight
2. Framing Lumber
3. Metal Flashing
4. Nails
5. Caulking
6. Wall Board
7. Framing Hangers
8. Sheathing Material
9. Roofing Material

TUBULAR SKYLIGHT



FEATURES & BENEFITS

- **Does not fade carpet or furniture**
- **Evenly disperses light**
- **Improves attitudes of the winter blues**
- **Fits where traditional skylights don't**
- **Improve air quality by reducing molds and mildew**
- **Full spectrum lighting-the healthy choice**
- **Requires about 1/3 as much light as fluorescent lights**
- **Best light source for color rendering**
- **"No Mess" Installation in just a few hours**
- **No structural changes**
- **Pollution Free**

How does TUBULAR SKYLIGHT work?

"TUBULAR SKYLIGHT", Inc. is a forerunner in Passive Daylighting Systems. Daylight has always been the preferred form of light: it is abundant, high in quality, and free! But collecting and conveying it to the right places at the right time - without also creating problems like glare, cooling load, and UV - has been a challenge for architects and lighting engineers. Now with TUBULAR SKYLIGHT those problems are solved. We can literally turn off the electric lights throughout most of the day and use free natural daylight for illumination. Thus saving money as well as precious energy. Energy efficiency is the cornerstone of our design philosophy. TUBULAR SKYLIGHT'S innovative design is a breakthrough in natural lighting. It delivers as much light, more economically, than a traditional skylight 10 times its size. Our back to basic design technology is honored to be utilized by one of the U.S. governments high technology facility, KENNEDY SPACE CENTER, Florida. Here this perform a very important task in the simplest way possible.

THE LIGHT SOURCE OF THE FUTURE

It is simplicity refined. At your roof, daylight enters a high impact resistant clear UV stable acrylic dome. A unique adjustable galvalume (up to 1O times more corrosive resistant than galvanized) flashing works on a flat through an 8/12 pitched roof (other flashing available). Next, a reflective tube (more reflective then a mirror) is installed from the roof through the attic for up to 20 feet to the ceiling of the room where light is needed. A patented thermoset adhesive process stops the separation of the 95% reflective surface from the aluminum tubing. Because of three unique sizes the tubing easily fits between rafters so no structural changes are necessary. Then the insulator disk seals to the ceiling creating a dead air space. A slightly curved double insulated translucent white acrylic dome creates a diffuser lens. This diffuser lens then spreads daylight evenly throughout the room where it is needed. Creating bright, cheerful places quickly, easily and economically.

Skylight Installation Instructions

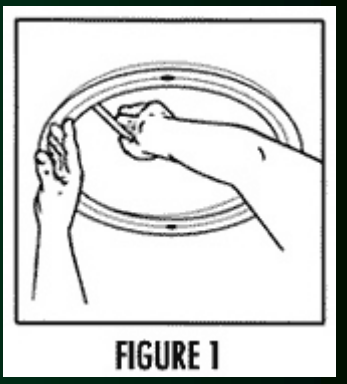


FIGURE 1

•First decide approximately where you would like your skylight located in your home.
•Check that the attic space is clear of obstructions above where you wish to locate the skylight.
•Measure to the center (between joists) and tap a small nail through the ceiling from the top. Then check that you have the correct position for your skylight from the inside of the room
•Using the up-stand of the ceiling frame as a template, mark the ceiling with a pencil, ensuring that the small nail hole is at the center. (See figure 1)

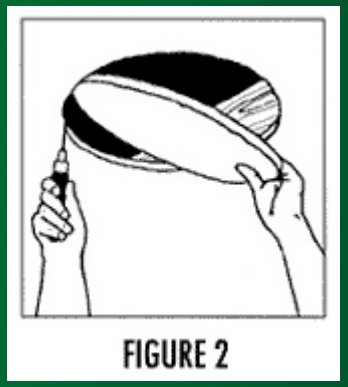


FIGURE 2

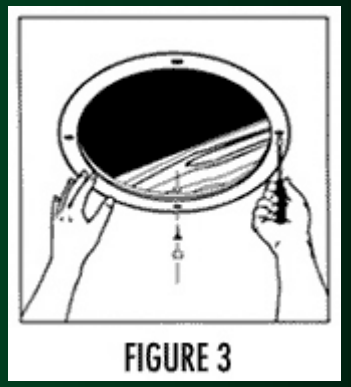


FIGURE 3

On the ceiling, cut along the pencil line with a key hole saw (see figure 2). Remove and save cutout for step #9.

Insert the ceiling frame and attach it with the 1 1/2" screw and plastic lugs provided. The plastic lugs are placed on the top side of the ceiling, fasten the screws through the holes in the ceiling frame, through the ceiling and into the plastic lugs and tighten. Finish off with the plastic caps into the screw heads. (See figure 3)

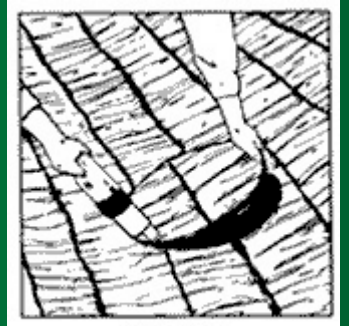


FIGURE 4

From the attic, choose the most direct route for the tubing to reach the roof, keeping in mind that tube must fit between the best rafters. (Note: Also consider that the skylights work best with southern exposure and that the shorter, straighter, and tighter the tube is, the better the performance. Skylights with tube lengths in excess of ten feet are not recommended.)

Measure the center between the appropriate rafters and tap a nail through the roof from underneath. Note: Make sure there is a clear area of roof above your desired location.

Using the ceiling cutout (from step #5) as a template, mark a circle on the roof surface around the base of the cutout. Be sure that the that the nail hole is at the center of the desired area.

Using a reciprocating or jig saw, cut around the circle and remove the section of unwanted roof material and sheathing. (See figure 4)

Attach the tubing to the skylight top frame by pulling the tube over the stainless steel ring on the underside of the sky light frame. The four stainless steel tabs should be bent out ward through the flexible tubing, and bent into a hook shape to hold the wire. Be sure that two or three strands of the wire skeleton of the tubing are above the tabs. Wrap around the junction of the skylight and the flexi-tube three times with the P.V.C. tape provided. Be sure to cover the tabs completely.

Measure down from the top of the roof surface to the top of the ceiling to establish the length of the flexi-tube required. Remember to allow extra for bends and angles in the tube.

Stretch the flexi-tube out and cut to the required length using a Stanley knife and wire cutters.

Pull the loose end of the flexi-tube over the stainless steel lower ring and attach it with the P.V.C. tape wrapped two or three times around the outside.

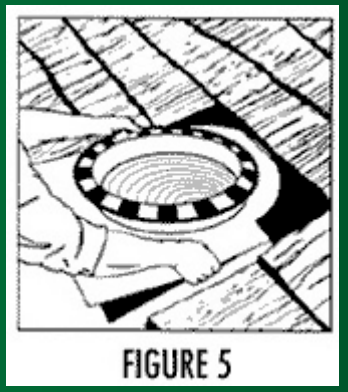


FIGURE 5

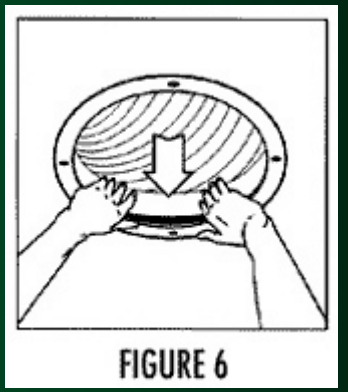


FIGURE 6

- With the tubing and lower ring attached to the underside of the skylight, slide the base into position of the roof. Ensure that the upper portion of the sheet metal flashing is underneath both the existing roof material and the underlying (felt). The lower portion of the sheet metal flashing should be on top of the existing roof surface and fastened in a similar manner to normal flashing requirements for the appropriate roof type. Note: Re-install any pieces of the roofing material to cover the side flashing removed during installation. (See figure 5)

Install vent and/or blank tabs into the top frame and secure the dome with the four brass screws provided.

From inside the room, reach through the ceiling hole and pull the stainless steel lower ring down into the ceiling frame. Attach it with the four sheet metal screws provided. (See figure 6)

Install the prismatic diffuser.

Diffuser may be flexed slightly to pass through ceiling opening and rest on top side of ceiling frame.
Note: Prismatic side face down.

Note: Be sure to remove the plastic protective film from the inside surface of both the upper and lower stainless rings.

Mechanical Specifications

Component and Description for Mechanical Evaluations

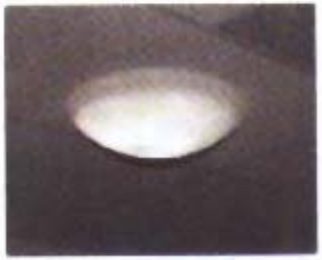
- Transparent U.V. stabilized grade 1 acrylic dome; I.C.B.O. #1084.
- Dome fixed with 4 non-corrosive screws.
- Vent tabs, (vented or solid) interchangeable.
- Luran S KR2854 black skylight base, ASTM tested; D638, D256, D792, D648.
- Base attachment (500-9 screws and 400-6 screws). Two continuous caulking beads seal frame to roof flashing base.
- 26 G.A. pre-painted colorbond flat metal flashing. Available in pre-bent form to take lead strip for tile roofs.
- Mirror-finish stainless steel ring, 28-gauge with four bendable tabs for tubing attachment.
- Three continuous wraps of PVC duct tape.

•Highly reflective, ultraviolet-proof quadruple laminate. It consists of a double outer- layer of metallized polyester film with a double inner layer of reinforced glass fiber filament. A yarn mesh aluminum foil with coiled-spring wire skeleton is imbedded between the two layers. UL 181 rated.
•28-gauge mirror-finish stainless steel ring.
•Four sheet metal screws attach stainless steel ring to ceiling frame.
•White ABS injection molded ceiling frame.
•K-12 prismatic acrylic diffusion panel.
•Screws attach ring to ceiling with retainer blocks. Screw cover also attaches (500-6 and 400-4).

HOW TO INSTALL

Insert Tube, Measure, Cut & Secure

Attach Foam Seal, Exterior Dome, Clamp & Storm Collar



Attach Interior Seals, Insulator Disk & Diffuser

Quick & Easy Installation

Locate Placement, Cut Hole in Ceiling

Cut Hole in Roof, Properly Seal Flashing

WHAT IT LOOKS LIKE ON THE ROOF

The Use of Flexible Tubing in Sun Tunnel Skylights

One of the key components in The Sun Tunnel Skylight system is fully flexible, reflective tubing. This tubing is similar in structural design to the tubing used for many decades in the heating and air conditioning industry and can be found in commercial businesses, high-rise buildings, hospitals, schools, and residential homes throughout North America and many other parts of the world.

Sun Tunnel has taken this time-proven technology for channeling heat and cold, and added a space-age U.V.-proof liner to the inside in order to channel sunlight efficiently through attics to dark rooms all over the world. The clear dome on the roof is made from almost totally U.V. resistant materials, eliminating harmful U.V. rays before they can even reach the tubing, guaranteeing that the flexible tube will perform for many years to come.

This flexible tubing makes The Sun Tunnel by far the most "user friendly" and easy-to-install tubular skylight on the market today. The ability to flex around almost any attic obstruction without the need for expensive elbows or extensions means that Sun Tunnel Skylights can be efficiently and economically installed in places no other skylight can reach. Naturally, the shorter, tighter and straighter you install the tubing, the better the performance, but Sun Tunnel Skylights are installed every week in hard-to-reach areas, sometimes with 90-degree bends in the tubing, and are still performing adequately.

Sun Tunnel has had a strong U.S. patent on its flexible tubing since the beginning of our operations here in 1993, and is therefore the only company offering this beneficial feature with its skylights. A rigid tube skylight competitor, known as Sola-Tube, offers a 10" diameter skylight in the U.S., and openly derides The Sun Tunnel's use of flexible tubing. This same company, however, uses flexible tubing with the skylights it markets in Australia, where it has proven to be a big seller for them, and is found proudly displayed in their Australian showrooms (see the upper right section of the photo.)

The new 22" diameter Sun Tunnel is the largest tubular skylight on the market today and will brighten the largest rooms in your home. Just like the tubing used in our other models, our 22" flexible tube passes all ignition, flammability and smoke density testing requirements necessary to meet National Building Codes standards across the United States. It invite us to compare our Sun Tunnels for brightness, ease-of-installation, and flexibility against any tubular skylight on the market. We think you'll like our quality, customer service and honesty.

Fan-Attic Installation

- Locate the area where you wish to install the Fan-Attic.
- The southern side of your roof is the best place, since the Fan-Attic works best in full sunlight.
- Using a reciprocating or jig saw, cut a 13-inch diameter hole through the roof material and sheathing, then remove the circular plug.
- Try to center the hole between the roof rafters to ensure clearance on the underneath side.

- Slide the unit into position from the lower side of the roof.
- Make sure that the upper portion of the flashing is underneath both the existing roofing material and the underlayment (felt).
- The lower portion of the flashing should be on top of the existing roof material.
- Fasten in a similar manner to normal flashing requirements for the appropriate roof type.
- Reinstall any pieces of the roofing material to cover the sides of the flashing that may have been removed during installation.

Installation Tips

Fan-Attic will work best in full sunlight. Southern exposure on the roof is ideal.

Avoid installing under overhanging trees or other structures creating shade.

Fan-Attic will also be most effective if installed as close as possible to the top ridge as natural convection causes hot attic air to rise upwards.

The Fan-Attic should be used in conjunction with existing soffit/gable vents to create a complete attic ventilation system. Your existing home should already have some form of soffit or gable ventilation. If your attic presently has no ventilation and The Fan-Attic will be the only form of ventilation to our attic space, it's possible that negative pressure could be created by removing the existing air while no outside air is coming in to replace it. It's unusual for a home to be this airtight, but if so, this problem can and should be overcome by the addition of soffit vents.

Maintenance

•To ensure optimum performance, it recommend that from time-to-time you clean the top of the solar panel with warm soapy water and rinse off.

•The fan motor is a brush type motor. Brushes may need replacement after several years of operation. This can be done from the underneath side with a screwdriver in about five minutes. Replacement brushes are available from your Sun Tunnel/Fan Attic Dealer.

Tubular Skylights will add light to any room of home

BEFORE TUBULAR SKYLIGHTS:

AFTER TUBULAR SKYLIGHTS:

COMMERCIAL ORGANIZATIONS USING TUBULAR SKYLIGHTS

BEFORE TUBULAR SKYLIGHTS:

John F. Kennedy Space Center

AFTER TUBULAR SKYLIGHTS:
WITH THE ELECTRIC LIGHTS OFF!!!

A Printing Organization

Webster Elementary School - Webster Florida

Skylight Problems:

Common problems : Skylights occasionally have problems:

Ceiling is damp around the opening (leaking): Leakage is the number one problem. 90 percent of all leaks are caused by a "flashing" problem. Flashing is a piece of metal that sits flush against a skylight opening and sweeps away any water. Many leaks are slow, and you may not see them for several years until the drywall next to the skylight starts to buckle.

Newer skylights are built in accordance with rugged construction requirements. Still they can crack with impact, especially if they are glass. If your skylight is in an area where it can be easily broken, consider replacing it with a plastic, shatter-resistant version. These have the added advantage of being lightweight and economical.

Some skylights can open a few inches to allow air circulation. They're usually operated with a pole. Occasionally the gears that raise and lower the skylight can get jammed.

Motor-controlled skylight isn't functioning properly: Some skylights can be opened automatically with motors. And like all mechanical things, these motors need occasional maintenance and repair. Your problem may also be electrical.

Manually operated shade isn't functioning properly: Many manufacturers have designed shades to fit within the frame of their skylights. Most are opaque, and can be opened and closed fully to give you maximum control over the amount of light you let in. Sometimes the gears that operate the shades can get jammed.

Motor controlled shade isn't functioning properly: Motor-controlled shades are a great option for skylights that are very high and out of reach. However, these motors need maintenance and repair from time to time. The problem may also be electrical.

Modern, top-of-the-line skylights that are carefully installed or repaired by a Service Professional can be expected to remain watertight for a long time.